The manual is divided into sections distinguished by two-digit numbers which correspond to the spare parts microfiches and repair tariff.

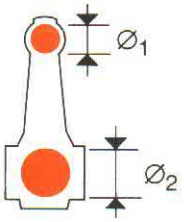
The **GENERAL INFORMATION and TECHNICAL DATA (00.)** section has the dual purpose of introducing the model and supporting the rest of the manual.
It includes technical data tables and specific information relating to the remaining sections of the manual.

The other sections (10. - 18. etc.) contain descriptions of repair operations.

NOTE *Section 10 describes the removal and refitting of the power unit.*
The engine bench overhaul procedure is published in a separate file identified by its own publication number. It should be inserted, in accordance with the engine size, in the appropriate sections of the "Petrol engine overhaul" or "Diesel engine overhaul" binders.

Graphic symbols are used in place of descriptions of mechanical components, operations or repair methods.
The shading of a component or part serves to highlight the part and to draw the reader's attention to the item to be measured or checked.

Example:



Small end diameter

Big end bearing location

Tighten to torque

THIS MANUAL IS PUBLISHED IN LOOSE-LEAF FORMAT TO FACILITATE MODEL UPDATING. THE "SERVICE INFORMATION" DETAILS SHOULD BE INSERTED IN THE VARIOUS SECTIONS AS AND WHEN THEY ARE ISSUED.

Introduction

The ***FIAT 126 BIS*** is a 3-door hatchback with monocoque body, rear-mounted engine and rear wheel drive.

The engine has 2 in-line horizontal cylinders with clockwise rotation; it is water cooled and longitudinally mounted in the rear compartment.

The ***FIAT 126 BIS*** is fitted with a 703 cm^3 engine which runs on 4-star petrol and delivers a power (EEC) of 18.5 kW (26 hp).

Symbols


Removal
Disconnect


Refitting
Connect


Dismantling
Disassembly


Fitting
Reassembly


Tighten to torque


Tighten to torque
plus angle


Stake nut


Setting
Adjustment


Visual examination
Check

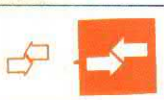

Warning


Lubricate
Lightly lubricate


Replacement
Genuine spare parts


Bleed
braking system


Surface to be machined
Machine finished


Interference
Force fit


Dimension to be measured
Measurement - Check
Thickness - Clearance

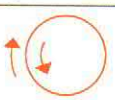

Inlet


Exhaust


Operation


Tolerance
Weight imbalance


Preload


Rotation


Preload


Angle
Value of angle

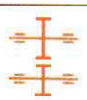

Compression
ratio


Grading
Categories


Oversize
... greater
Maximum


Undersize
... smaller
Minimum


Engine speed


Ratio

Pressure


Temperature


Temperature <0°C
Cold
Winter


Temperature >0°C
Hot
Summer

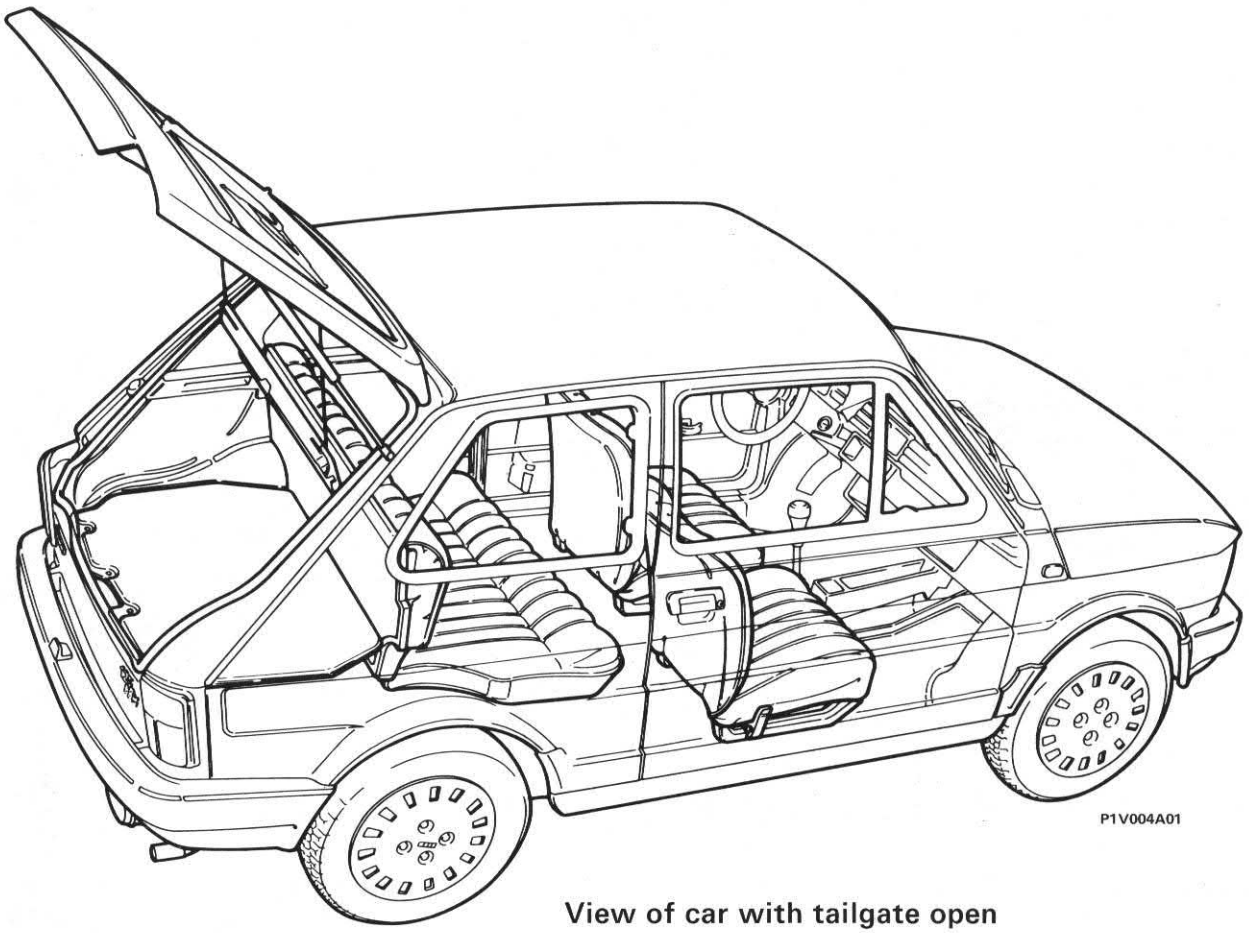

Windscreen wiper
with washer
pump


Rear window wiper
with washer
pump

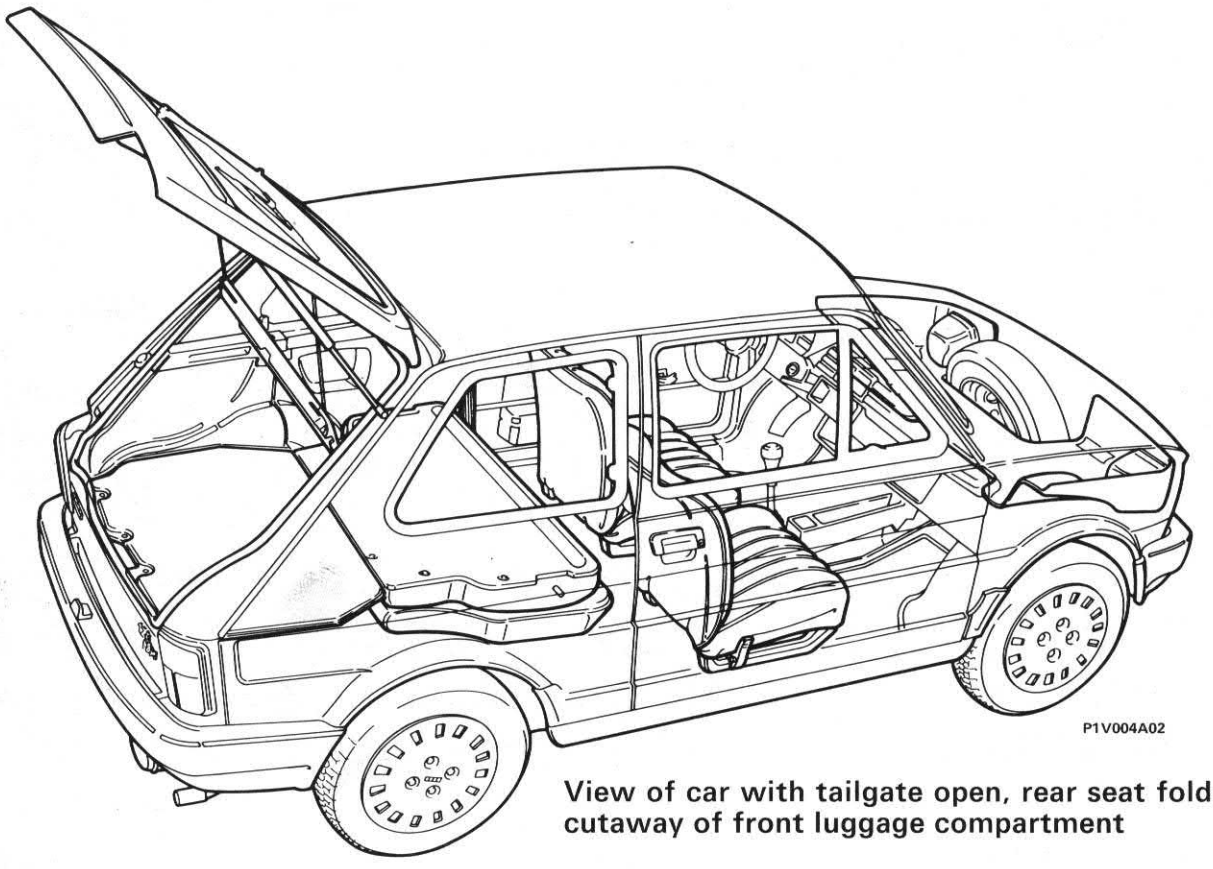

Engine

3/4 front view

3/4 rear view with tailgate open

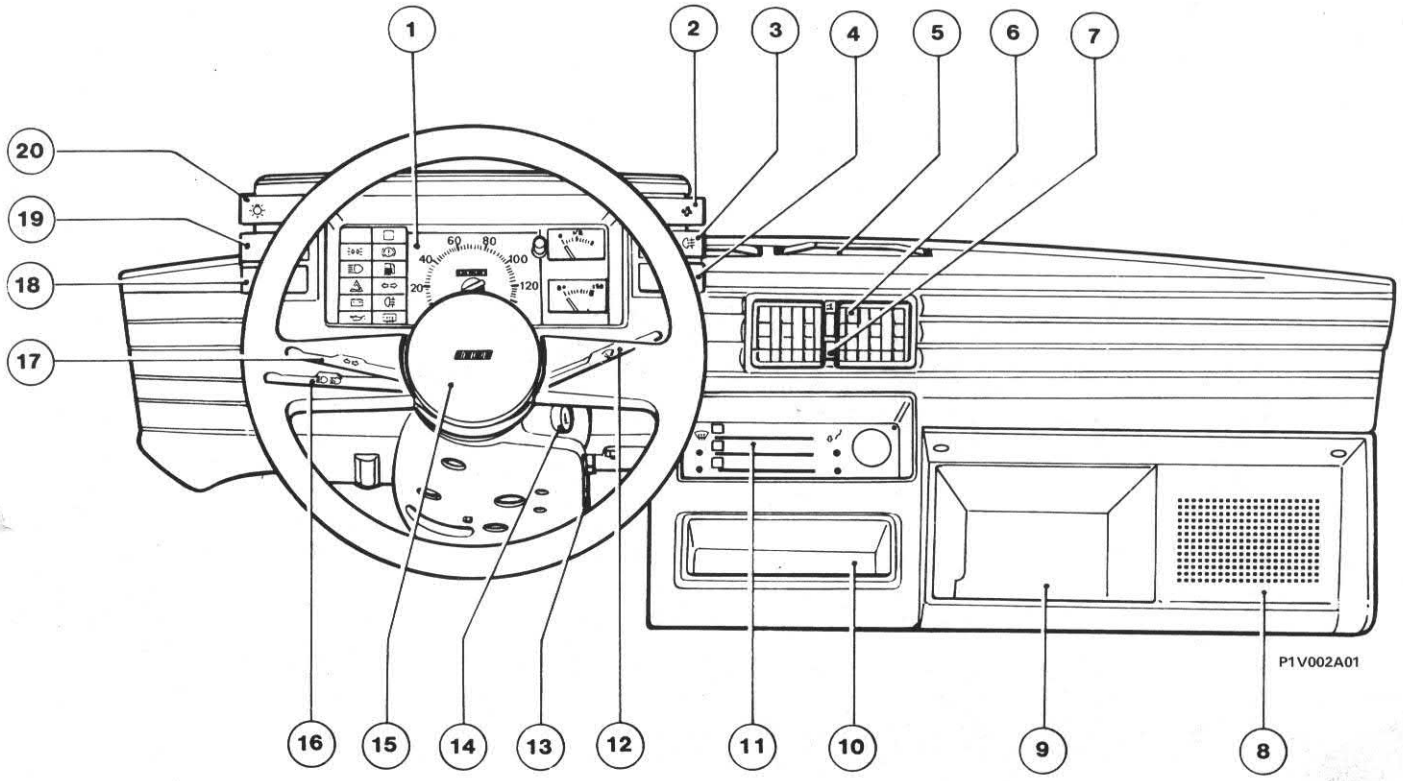


View of car with tailgate open



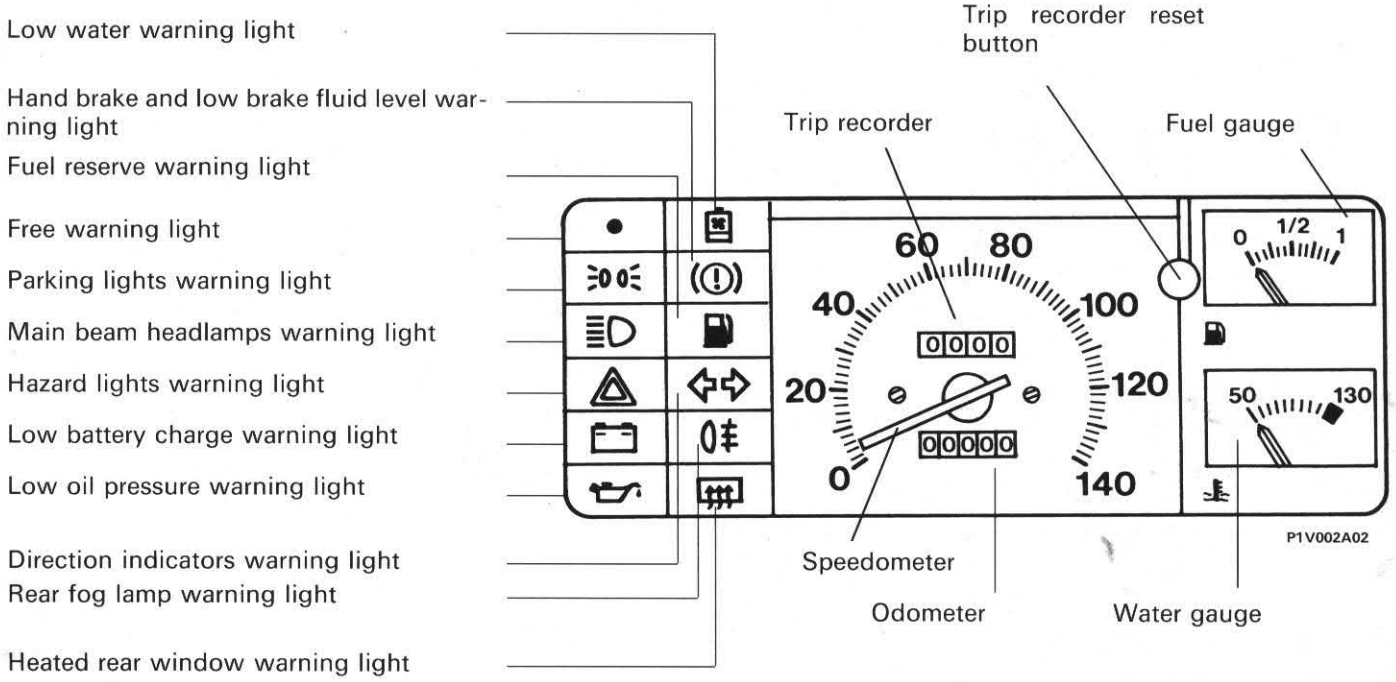
View of car with tailgate open, rear seat folded and cutaway of front luggage compartment

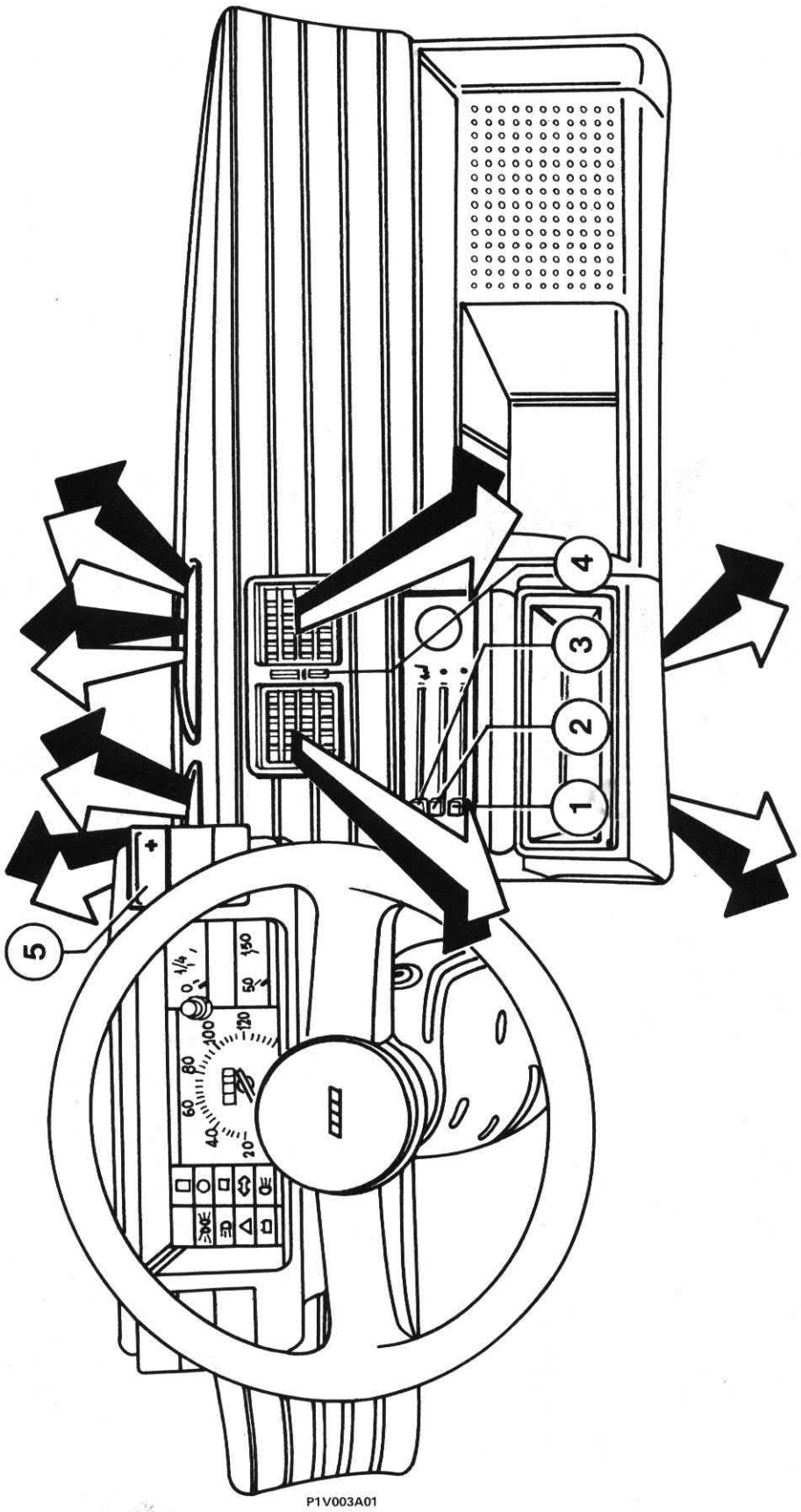
FASCIA



1. Instrument panel - 2. Fan - 3. Rear fog lamp - 4. Rear window wash/wiper - 5. Windscreen demist/de-icer - 6. Air vent - 7. Air volume adjustment - 8. Loudspeaker housing - 9. Stowage compartment - 10. Stowage shelf - radio housing - 11. Heater/ventilation controls - 12. Bonnet release catch - 13. Windscreen wash/wiper - 14. Ignition switch - Parking lights - Steering lock - 15. Horn push - 16. Main/dipped beam headlamps - 17. Direction indicators - 18. Heated rear window - 19. Hazard warning lights - 20. Exterior lights

INSTRUMENT PANEL

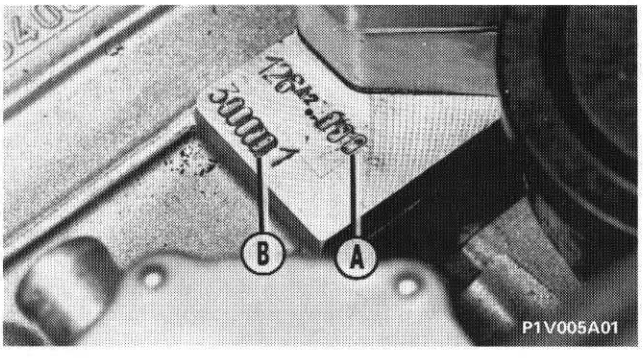




1. Air temperature adjustment lever
2. Air volume adjustment lever
3. Air to screen/vehicle selection lever
4. Central vent open/close lever
5. Two-speed fan switch

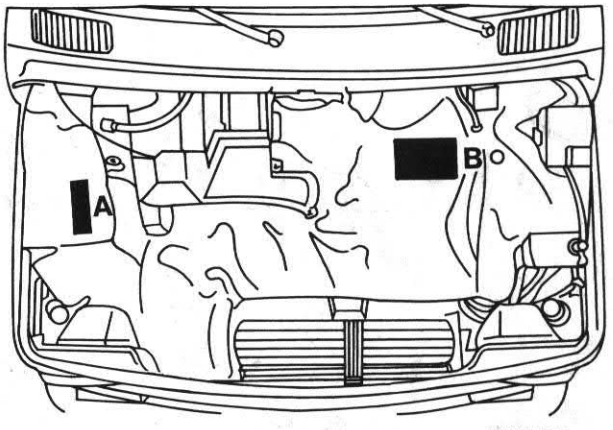
	CHASSIS	ENGINE	VERSION	3 DOORS	4-SPEED GEARBOX
703	ZFA 126A 100	126 A02 000	126 AA 43A	●	●

Engine identification: stamped on cylinder block near petrol pump

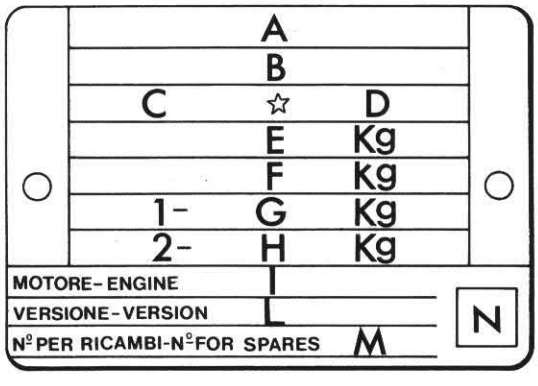


A. Engine type
B. Engine serial number

A Vehicle type identification code and chassis number



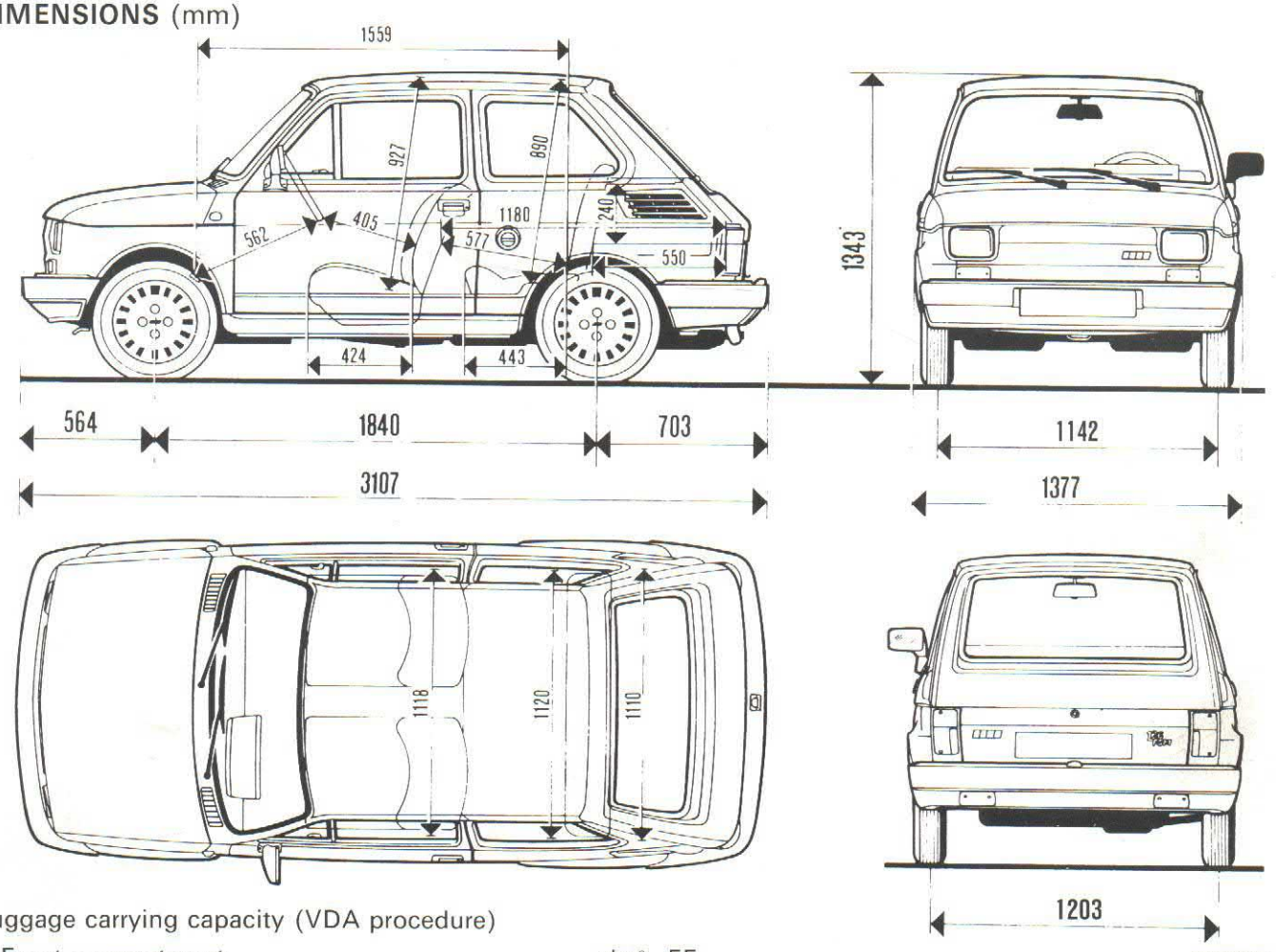
B V.I.N. Plate (E.E.C. standards)



A. Manufacturer's name
B. Approval number
C. Vehicle type identification code
D. Chassis serial number
E. Maximum laden weight
F. Maximum laden weight plus trailer
G. Maximum permissible front axle load
H. Maximum permissible rear axle load
I. Engine type
L. Body version code
M. Number for spares
N. Space reserved for diesel vehicles (correct smoke absorption coefficient)

00.0

DIMENSIONS (mm)



Luggage carrying capacity (VDA procedure)

– Front compartment:	dm³	55
– Rear compartment: seat in normal position	dm³	110
seat half folded	dm³	270
seat fully folded	dm³	500

Height refers to unladen vehicle

WEIGHTS (kg)

Vehicle in running order	620
+ 345 = 65*	965
+ 65*	347
	618
	Not suitable for towing

65* { 25 kg in front luggage compartment
40 kg in rear luggage compartment

POWER UNIT	703
GEARBOX	1 3 2 4 R

Speed km/h (2 persons + 20 kg) 	1	34
	2	53
	3	84.5
	4	116
	R	30
Gradient fully laden 	1	24
	2	14
	3	8
	4	4.6
	R	26.3
Fuel consumption as per ECE standards (litres/100 km)  	Urban cycle (A)	5.8
	Constant speed of 90 km/h (B)	4.4
	Constant speed of 120 km/h (C)	–
	Average consumption (CCMC proposal) $\frac{A + B + C}{3}$	–

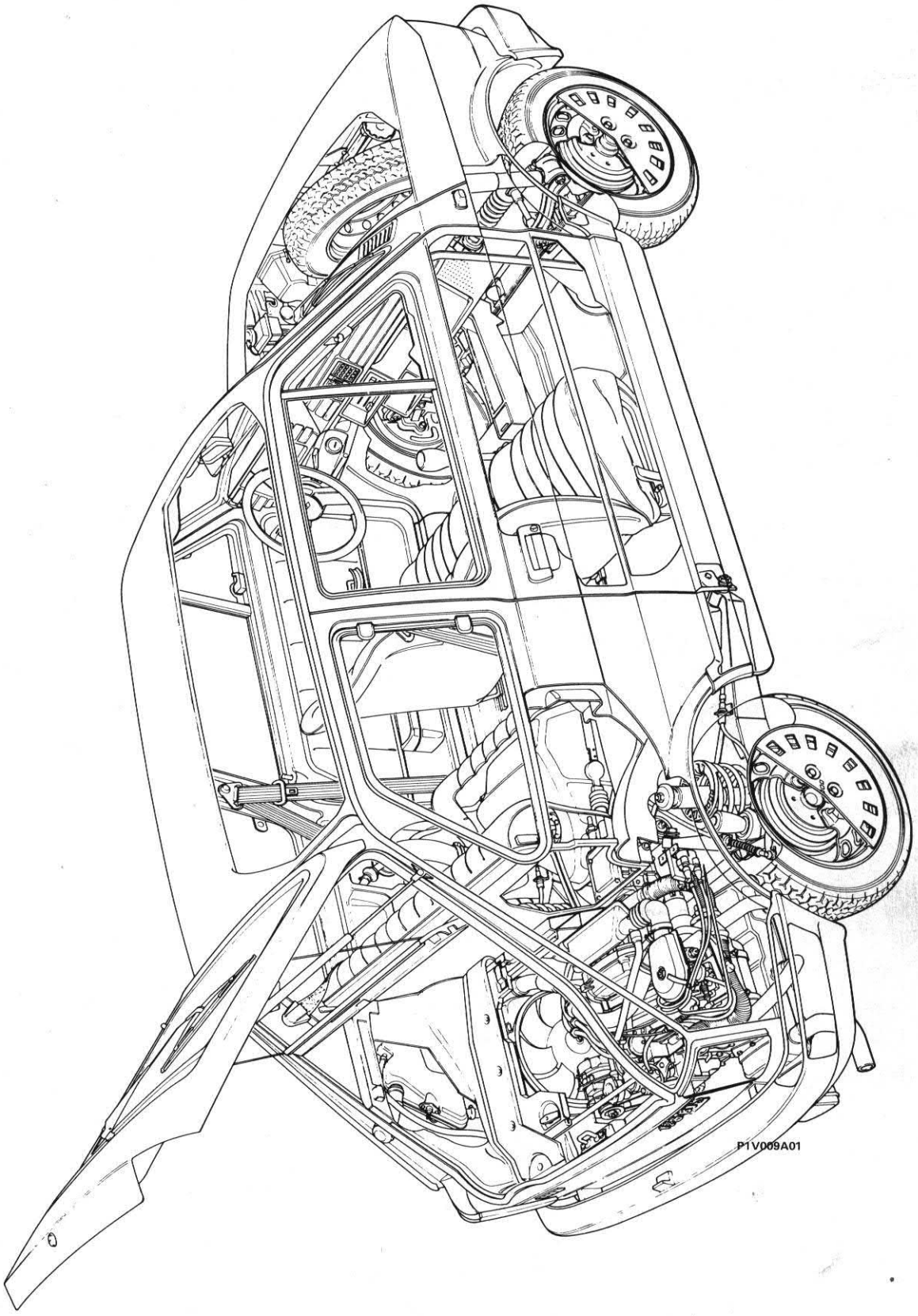
SOLID COLOURS		SEAT MATERIALS AND COLOURS Mixed (Cloth/Imit. leather) - 346
Meteor Ivory	205	●
White	224	●
Oslo Grey	626	●
Aegean Blue	444	●
Racing Red	854	●

OPTIONAL FEATURES (Italian market only)

Inertia reel front seat belts	■
Hazard warning lights	■
Reclining front seats	▲
Rear seat belts	▲
Rear window wash/wiper + opening rear side windows	▲
Additional external rearview mirror	▲

■ standard
▲ on request

CUTAWAY VIEW OF THE CAR SHOWING LAYOUT OF THE MECHANICS



00.0

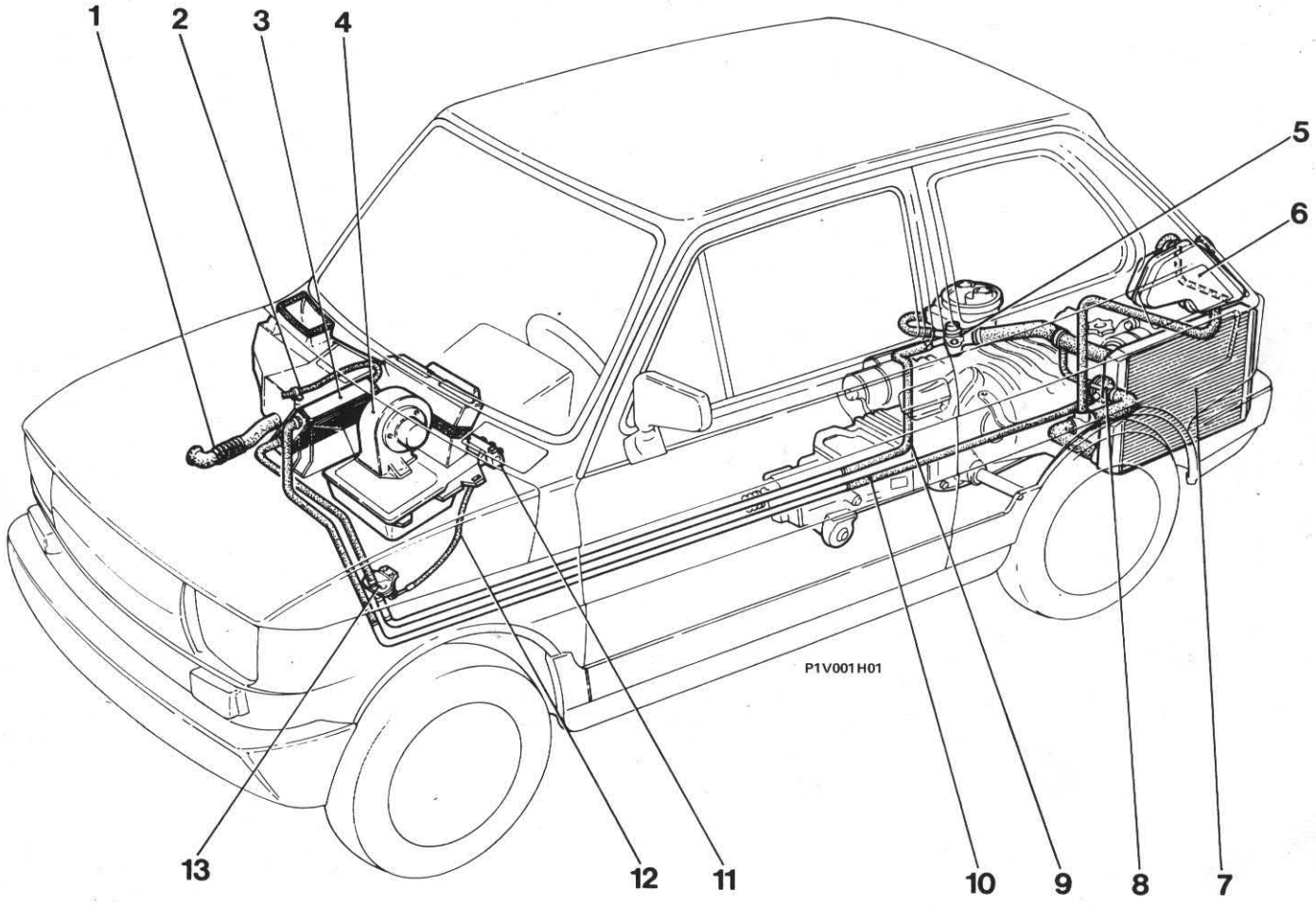
Fluid	Part to be filled		Quantity dm³	Quantity (kg)
Petrol RON 98-100			21	–
50% ▲ + Paraflu FIAT 11	Total capacity of cooling system		4.8	–
VS+ Superstagionale (SAE 10 W) (SAE 20 W) (SAE 30) (SAE 40) VS Supermultigrado (SAE 10 W/30) (SAE 15 W/40)	Total capacity		–	–
	Service capacity (drain and refill)		2.25	2
a = TUTELA ZC 90		a	1.10	1
b = TUTELA GI/A		b	–	–
TUTELA W 140/M DA	a	a	–	–
	b Limited slip	b	–	–
a e b = TUTELA GI/A	a	a	–	–
c = TUTELA W 90/M-DA	b	b	–	–
	c	c	–	–
d = K 854	d	d	0.14	0.127
TUTELA DOT 3	Total capacity		0.35	0.35
+ DP1	3%		2	–
	~ –10°C 50%			
	~ –20°C 100%		2	–

Olio Fiat Lubricant specifications

for cars and commercial vehicles

Product name		Description International designation	Application
VS+ Superstagionale	SAE 40	Low ash detergent oil for petrol engines. API "SE" series. Better than European CCMC-G1 specification	Temperature 0°C - >35°C
	SAE 30		Temperature 0°C - <35°C
	SAE 20 W		Minimum temperature – 15°C - 0°C
VS+ Supermultigrado	SAE 10 W/30	Low ash detergent oil for petrol engines. API "SF" series. Better than European CCMC-G2 specification	Temperature below –15°C - 30°C
	SAE 15 W/40		Temperature – 15°C - >35°C
VS+ Turbo Synthesis SAE 15 W/40		Synthetic based detergent oil for petrol engines. API "SF"series. Better than European CCMC-G2 specification	Temperature – 15°C - >40°C
VS Diesel Superstagionale	SAE 40	Diesel engine oil. API "CD" series. To MIL-L-2104 D and CCMC-D2 specifications	Temperature 0°C - 50°C
	SAE 30		Temperature – 5°C - 30°C
	SAE 20 W		Temperature – 15°C - 15°C
VS Diesel Supermultigrado	SAE 10 W/30	Diesel engine oil. API "CD" series. To MIL-L-2104 D and CCMC-PD1 specifications	Temperature below –15°C - 30°C
	SAE 15 W/40		Temperature – 15°C - >40°C
VS Turbo D		Diesel engine oil. API "CD" series. To MIL-L-2104 D and CCMC-PD1 specifications	Temperature – 15°C - >40°C
TUTELA ZC 80S		SAE 80/W oil. To MIL-L-2105 and API GL4 specifications	Manual gearboxes and differentials
TUTELA ZC 90		SAE 80 W/90 oil - non-hypoid EP - for manual gearboxes, containing anti-wear additives.	Gearboxes and non-hypoid differentials
TUTELA W 90/M DA		Special SAE 80 W/90 EP oil for ordinary and limited slip differentials. To MIL-L-2105 C and API GL5 specifications	Hypoid differentials Limited slip diff. Steering boxes
TUTELA GI/A		"DEXRON II" automatic transmission fluid.	Automatic transmissions. Power steering
TUTELA JOTA 1		Lithium-based grease, NLGI 1 consistency.	Multi-purpose, except components particularly exposed to water which require specific greases
TUTELA MRM2		Water-repellent lithium-based molybdenum disulphide grease, NLGI 2 consistency	CV joints
TUTELA MR3		Lithium-based grease, NLGI 3 consistency	Wheel bearings, tie rod ends, various parts
TUTELA DOT 3 TUTELA DOT 4		Hydraulic brake fluid, to U.S. FMVSS no. 116, SAE J 1703, ISO 4925 and CUNA NC 956-01 standards	Hydraulic brake and clutch systems
K 854		Lithium-based grease, NLGI 000 consistency, containing molybdenum disulphide	Rack and pinion steering systems
SP 349		Special castor oil and sodium based grease containing graphite and molybenum disulphide, compatible with brake fluid and rubbers	Brake regulator Brake regulator link bush
Autofà DP1 Liquid		Alcohol-based liquid detergent	To be used undiluted or diluted in front and rear screen wash systems
Paraflu Liquid[11] FIAT		Monoethylene glycol based anti-freeze with inhibitors for cooling systems	Cooling systems Concentration 35% down to – 25°C 50% down to – 35°C
Diesel Mix		Protective additive for diesel engines	Mix with diesel (17 cc per 10 litres)

Diagram showing passenger compartment heating/ventilation system



1. Air intake pipe
2. Radiator bleed pipe
3. Passenger compartment heating radiator
4. Electric fan
5. Delivery fitting on cylinder head
6. Expansion tank
7. Radiator
8. Thermostat
9. Delivery pipe to passenger compartment heating radiator
10. Return pipe from passenger compartment heating radiator
11. Regulation controls
12. Cut-off valve control cable
13. Cut-off valve

50.

PASSENGER COMPARTMENT HEATING/VENTILATION SYSTEM

Description of system (refer to diagram on previous page)

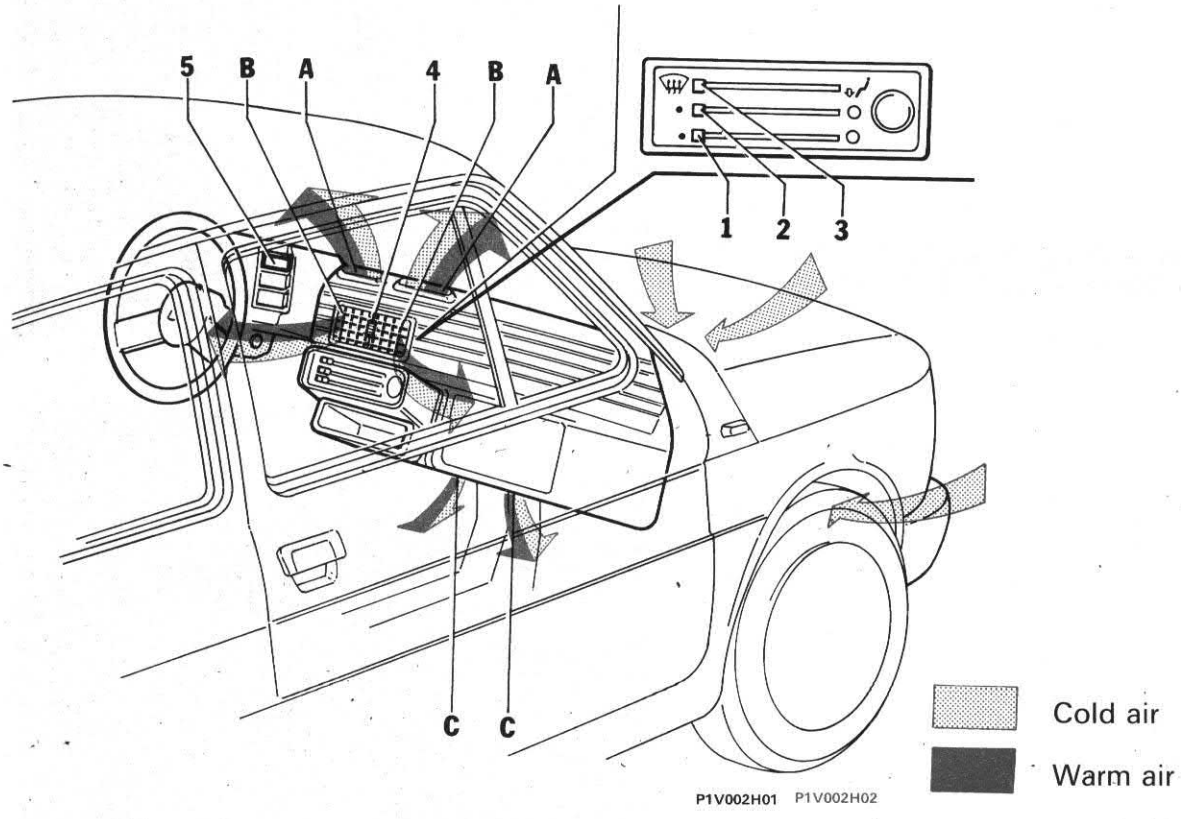
Coolant from fitting (5) on the cylinder head reaches the passenger compartment heating radiator (3) located inside the heating-ventilation unit.
The coolant then returns to thermostat (8) through pipe (10).
A cut-off valve (13) located on delivery line (9) allows heating to be turned on or off by cutting off the flow of coolant to the passenger compartment heating radiator (3).

The heating and ventilation system consists of two units, one located in the front luggage compartment containing the passenger compartment heating radiator (3) and fan (4) - the other inside the passenger compartment including regulation controls (11), air flow adjustment and deviation flaps and cut-off valve (13) for turning the heating on and off.

Operation (refer to diagram below)

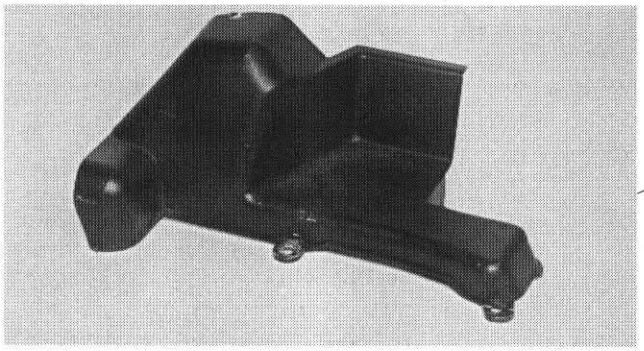
Lever (1) controls the cut-off valve to increase or decrease (to cut-off point) the flow of coolant to the passenger compartment heating radiator in order to regulate the temperature of the air supplied by the heating system.
Lever (2) moves the flap that adjusts the flow of air from the heating system.
Lever (3) moves the flap that directs the air flow towards the top (A) or bottom (C) outlets.

Lever (4) opens or closes central adjustable outlets (B).
Switch (5) activates the fan and adjusts the speed (and consequently the air flow) to two settings.



1. Air temperature adjustment lever
2. Air flow adjustment lever
3. Windscreen-footwell air distribution lever
4. Central outlet open-close lever
5. Fan activation switch
A. Top windscreen outlets
B. Central outlets
C. Lower outlets

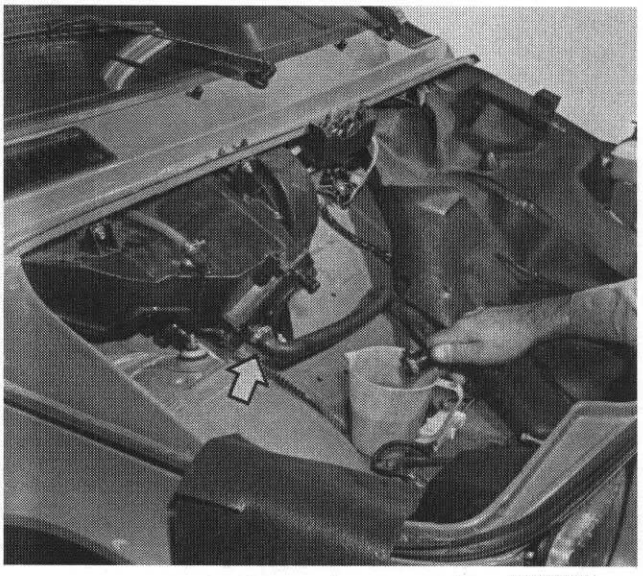
REMOVING - REFITTING HEATER UNIT



P1V003H02

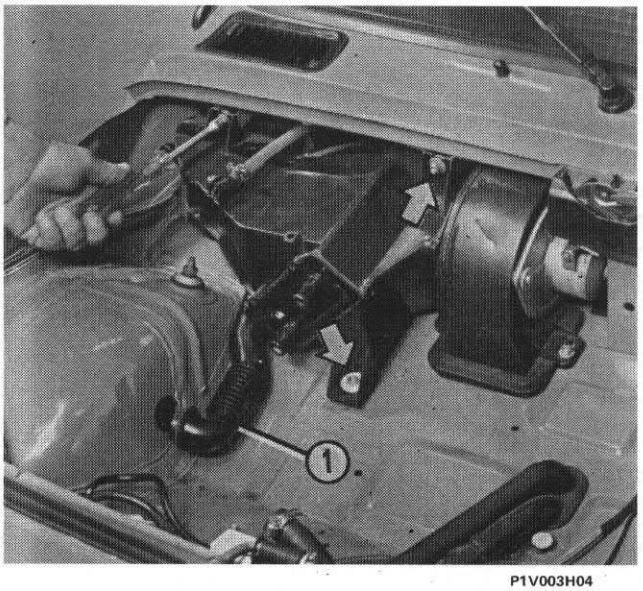
- Undo the fastening studs and remove the heater unit shield.

P1V003H01



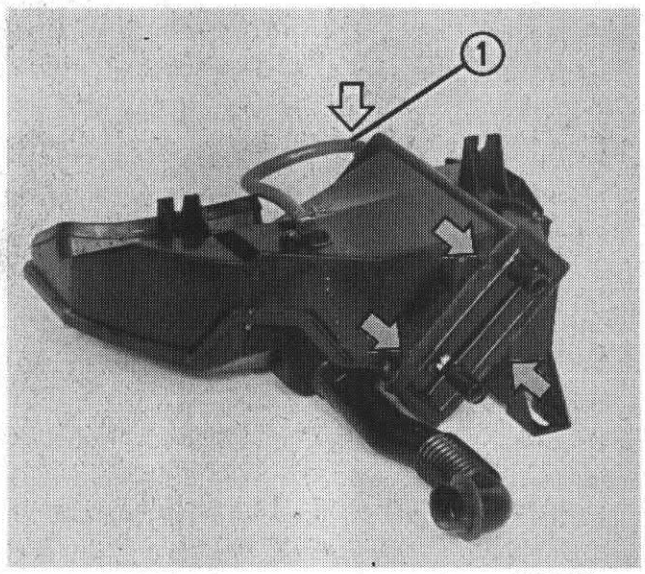
P1V003H03

- Disconnect the passenger compartment radiator delivery and return lines and save the coolant.



P1V003H04

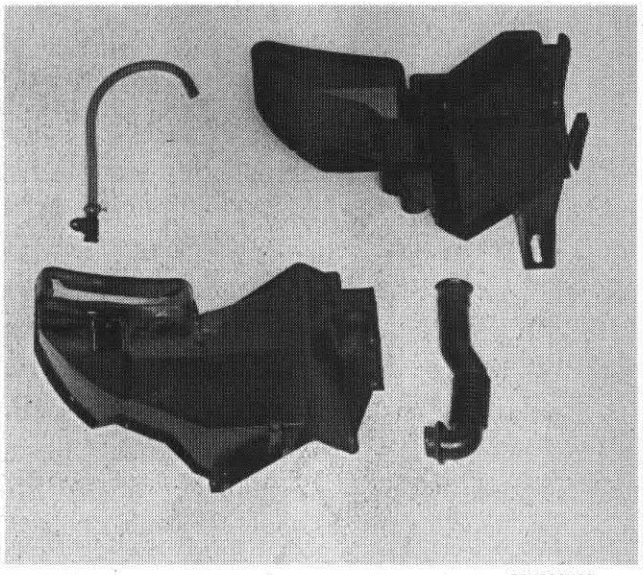
- Back off the heater unit retaining nuts.
- Disconnect air intake sleeve (1) from the wheel arch.
- Remove the heater unit.



P1V004H01

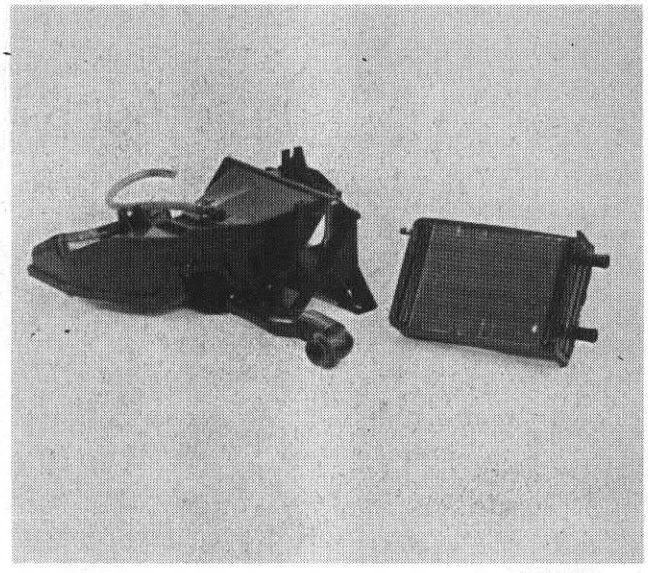
DISMANTLING HEATER UNIT

- Disconnect the bleed pipe from the passenger compartment heating radiator (1).
- Back off the bolts retaining the passenger compartment radiator and remove from the heater unit.



P1V004H03

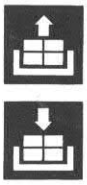
- Remove the connecting bolts from round the outside of the two halves and separate.

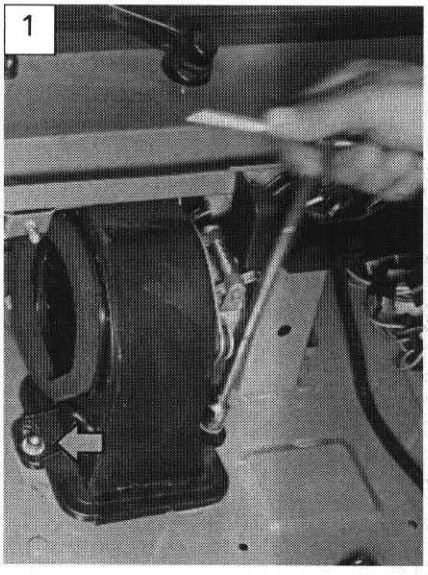


P1V004H02

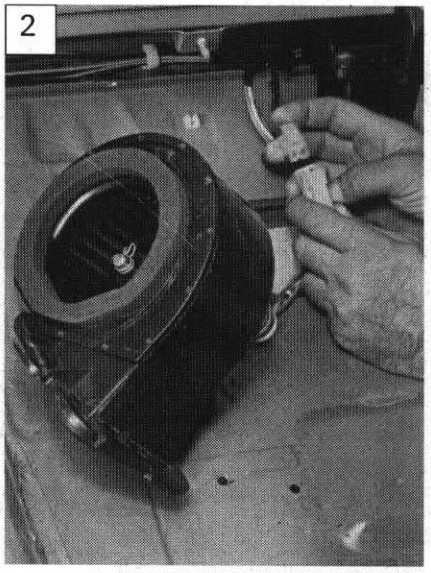
Heater unit case and passenger compartment heater radiator.

REMOVING-REFITTING AND DISMANTLING ELECTRIC FAN UNIT





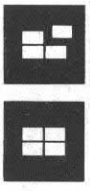
P1V005H01

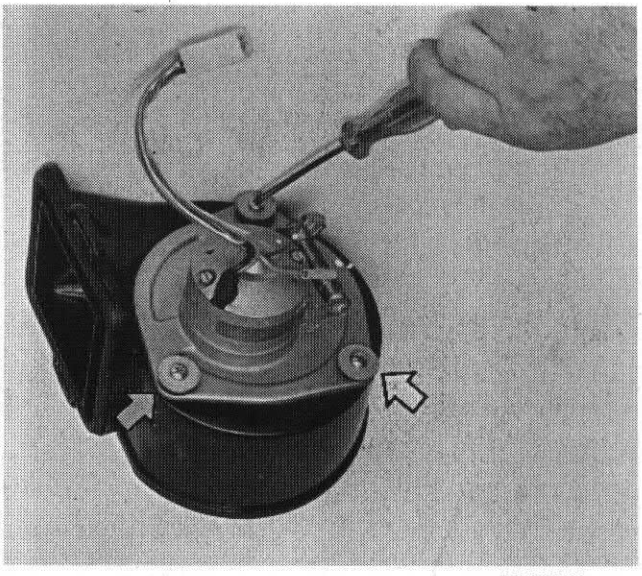


P1V005H02

Removing-refitting electric fan unit

- Back off retaining screws (2);
- disconnect connector (2).

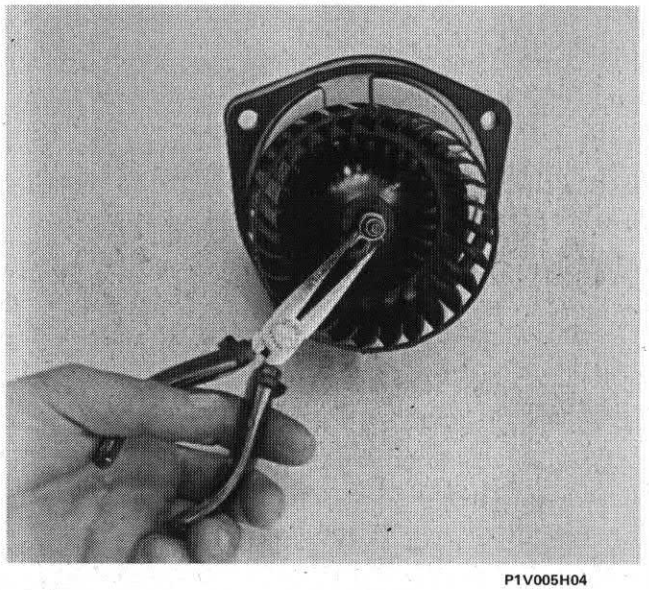




P1V005H03

Removing-fitting electric fan from screw

- Back off the screws indicated.

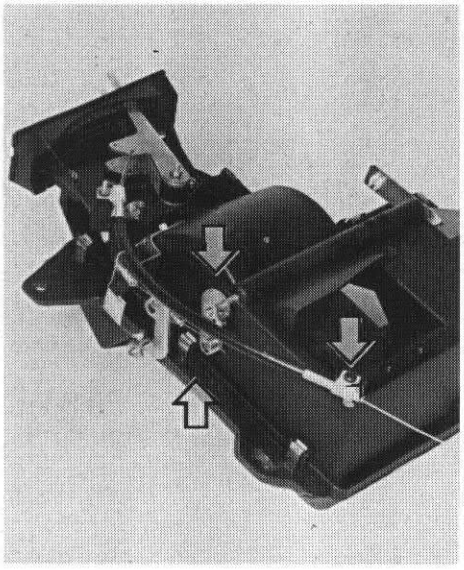


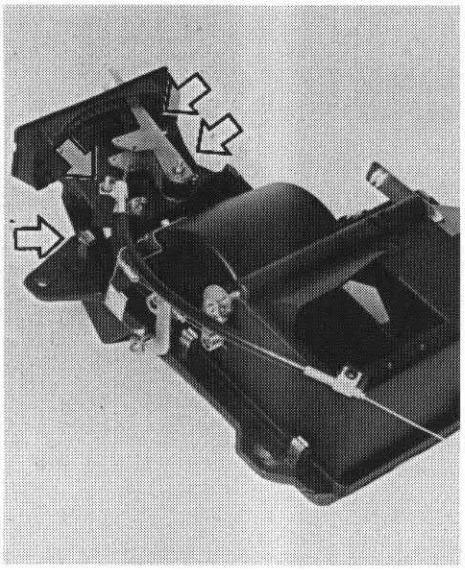
P1V005H04

Dismantling-fitting fan from power unit

- Release the retaining clip and withdraw the impeller.

50.

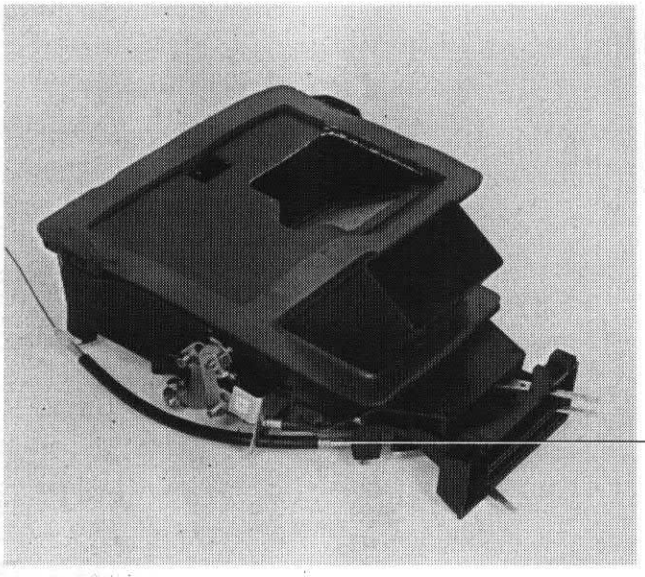




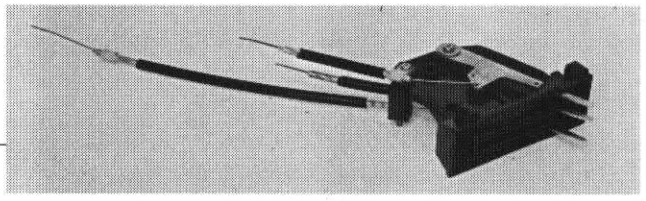
DISMANTLING HEATING SYSTEM CONTROL UNIT

Removing-refitting control lever and cable unit.

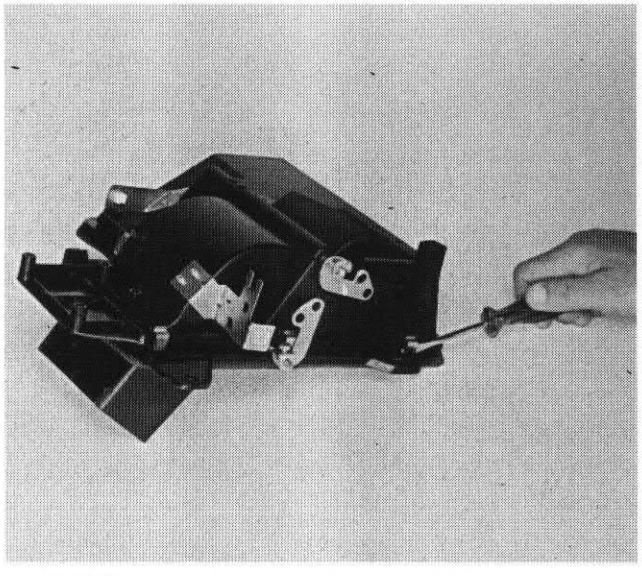
Remove fasteners indicated by arrows in the diagram.



NOTE *Operations for removing/refitting control unit from car are described in Section 70 Bodywork.*

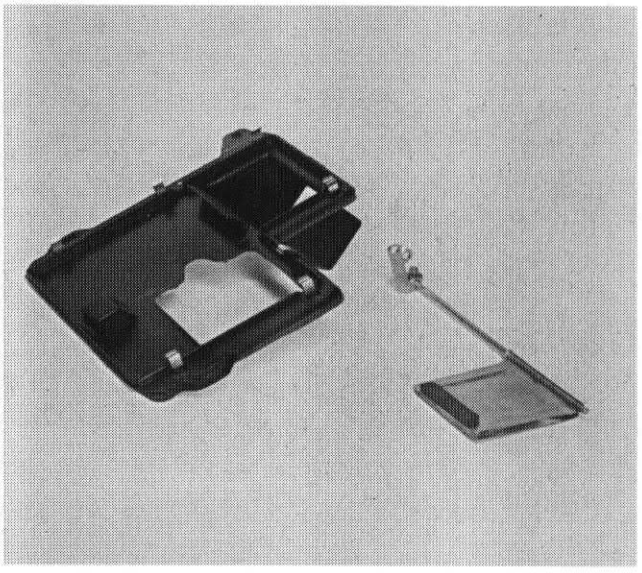


View of control unit



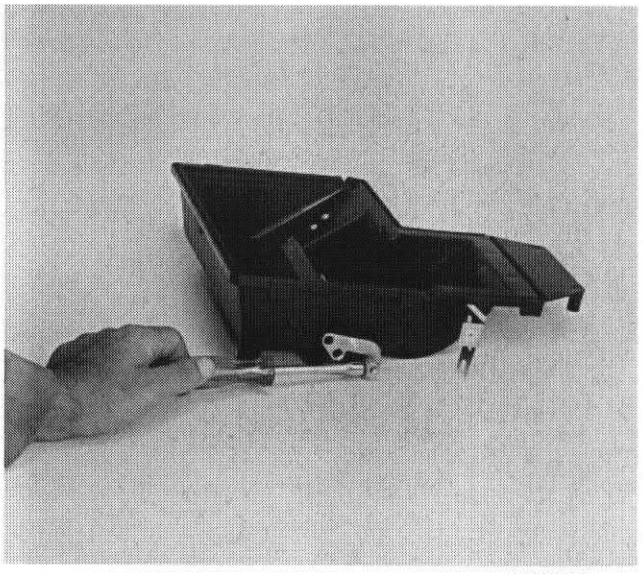
Separating halves of case

Release connection clips around the outside.



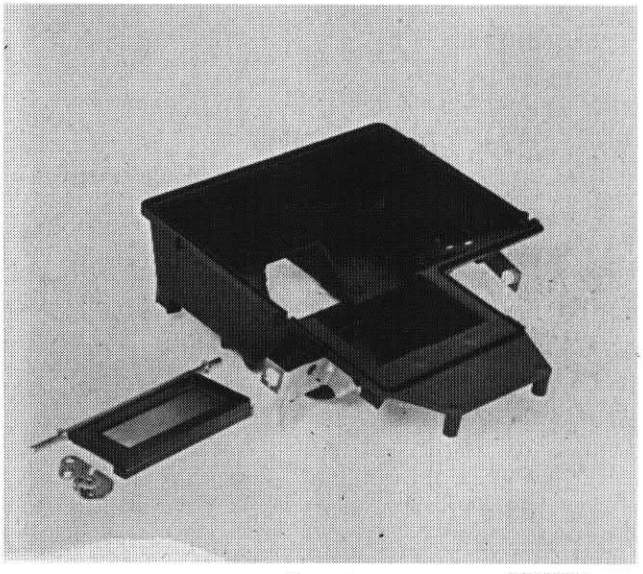
P1V007H01

Top case half and warm and cold air blender flap.



P1V007H02

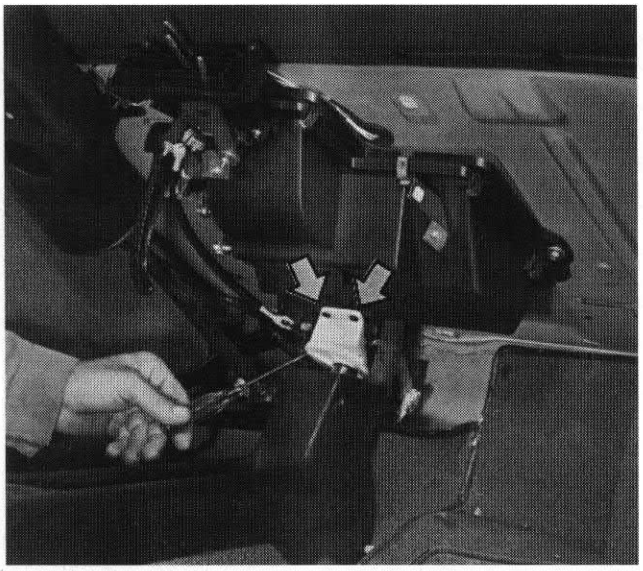
Dismantling-fitting bottom air flow deviation flap.



P1V007H03

Bottom flap and air flow deviation flap.

50.



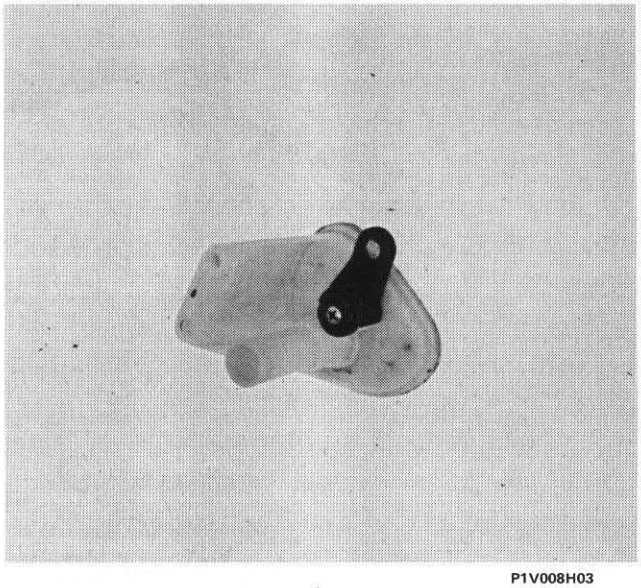
P1V008H01

REMOVING - REFITTING COOLANT CUT-OFF VALVE

- Disconnect control cable from cut-off valve.
- Back off screws fastening valve to heater control case indicated by arrows.

P1V008H02

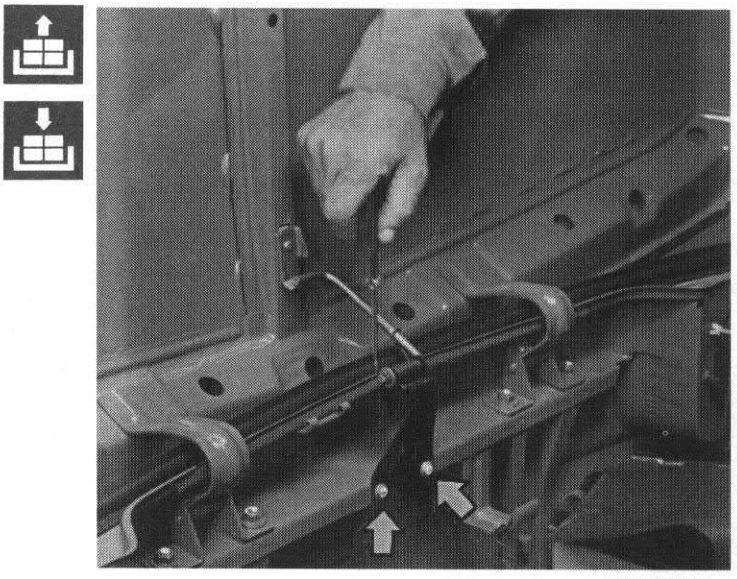
- Drain the system, then slacken the clips round the inlet and outlet pipes.
- Refit the valve by carrying out removal operations in reverse order.
- Top up coolant in cooling system.



P1V008H03

View of coolant cut-off valve

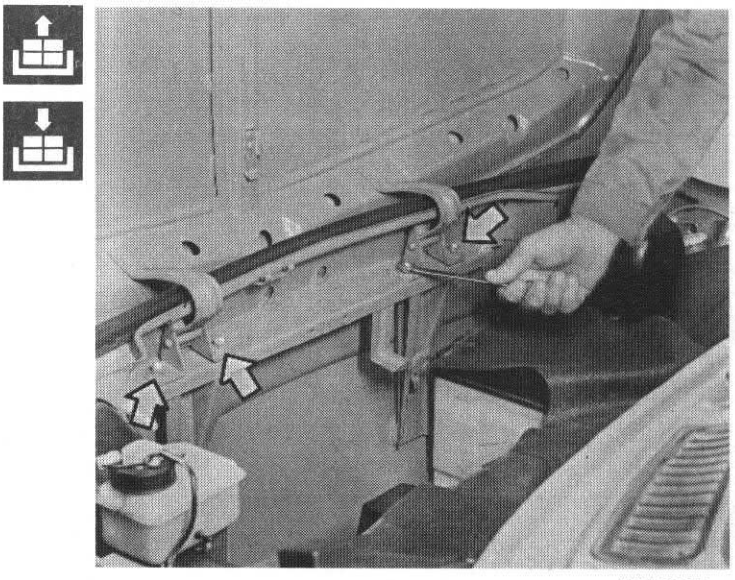
FRONT LUGGAGE COMPARTMENT LID



P1V01AM01

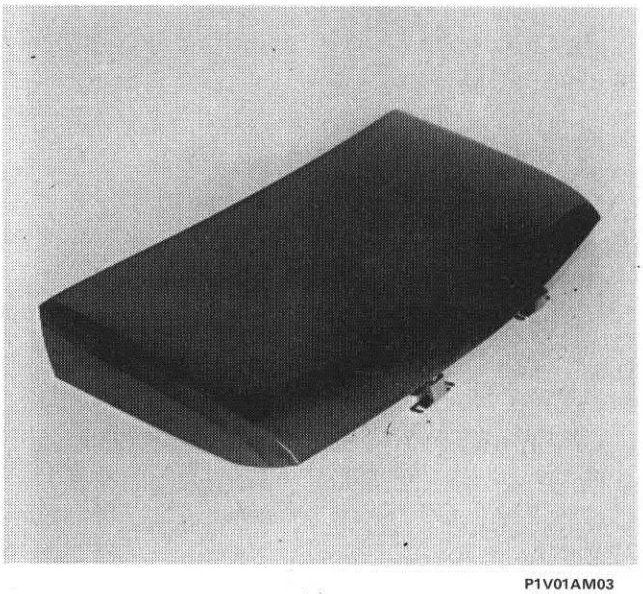
Removing-refitting front luggage compartment lid

- Back off the three bolts retaining the open limit device.



P1V01AM02

- Back off the four bolts retaining the hinge to the front crossbeam and remove the front luggage compartment cover.

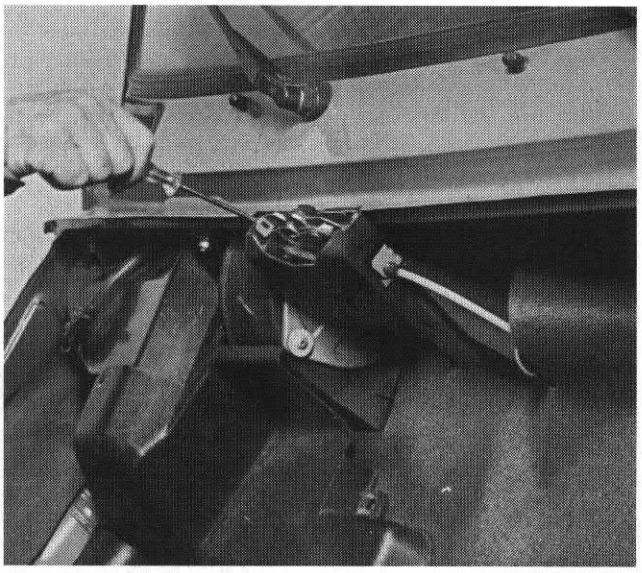


P1V01AM03

Front luggage compartment lid separated from car

- Refit the front luggage compartment lid to the car by carrying out removal operations in reverse order.

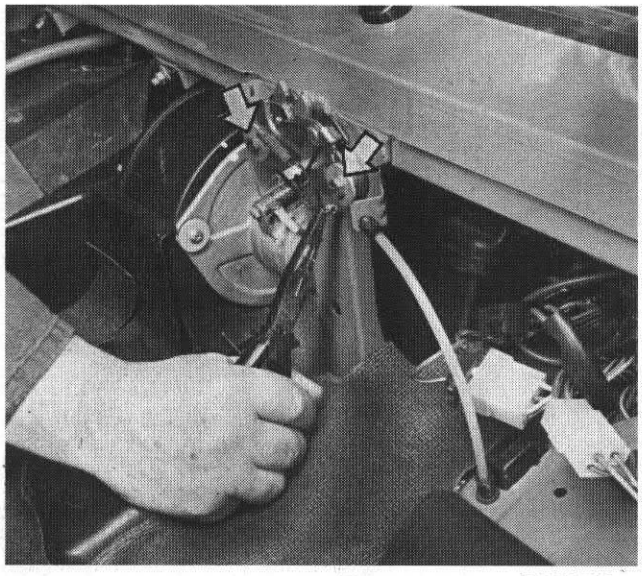
70.



P1V02AM01

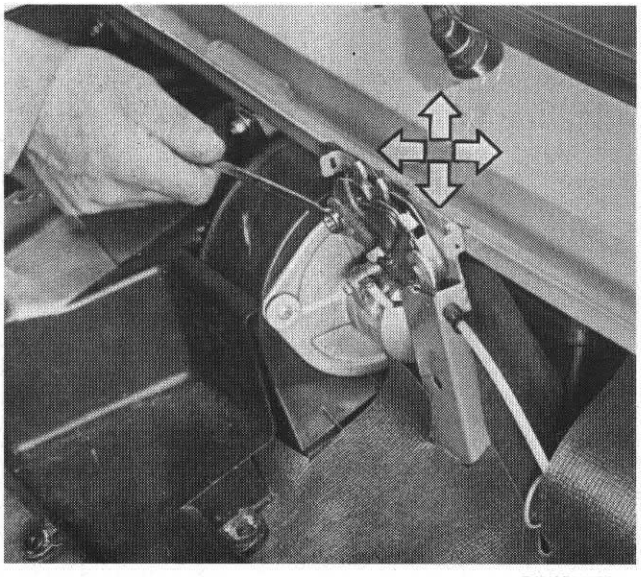
Removing-refitting luggage compartment catch

- Remove the luggage compartment catch cover.



P1V02AM02

- Disconnect the cable from the catch as indicated, unscrew the two arrowed screws and remove.
- Carry out removal instructions in reverse order to refit, adjust the device position.



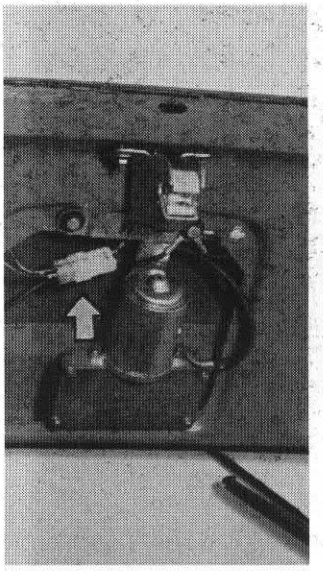
P1V02AM03

Adjusting luggage compartment lid catch

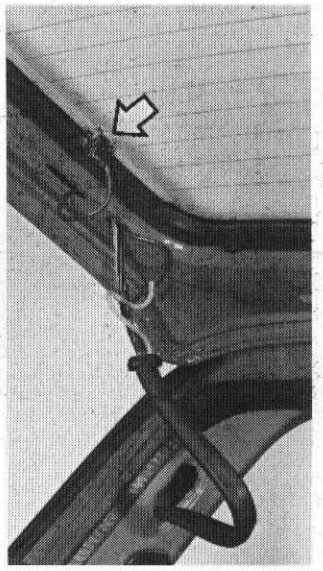
NOTE *The arrows indicate possible movements of catch.*

- Tighten retaining screws following adjustment.

REMOVING - REFITTING TAIL-GATE



P1V03AM01



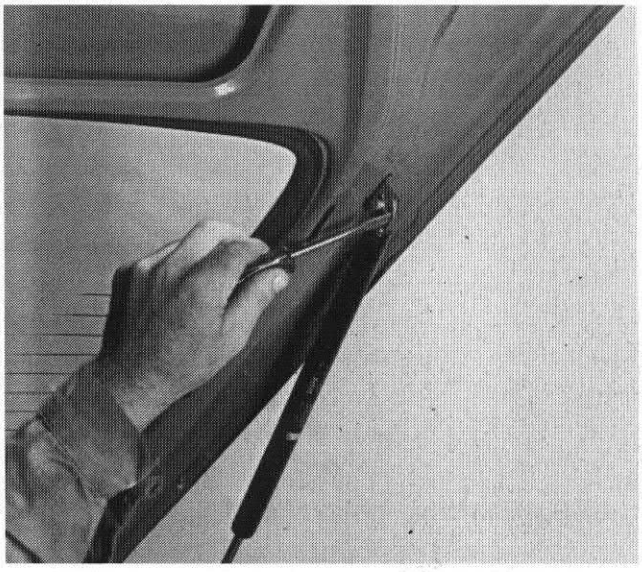
P1V03AM02

Proceed as follows:

- Disconnect battery negative lead.
- Disconnect rear wiper motor connector.
- Disconnect rear screen connector.

P1V03AM03

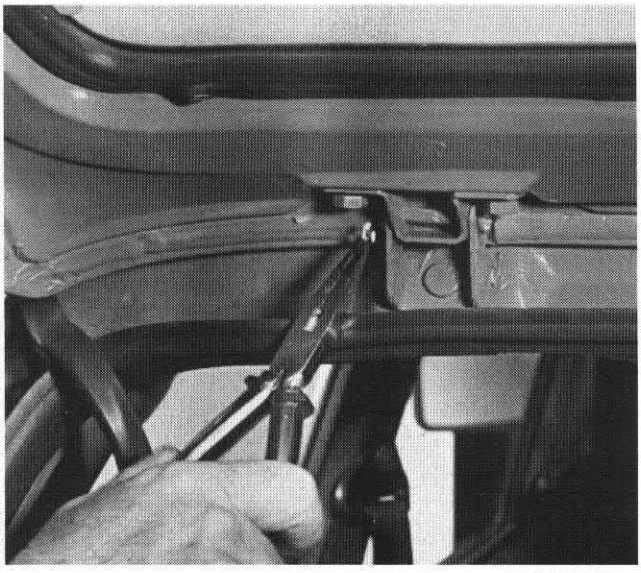
- Withdraw cable bundle from tail-gate frame as shown in the diagram.



P1V03AM04

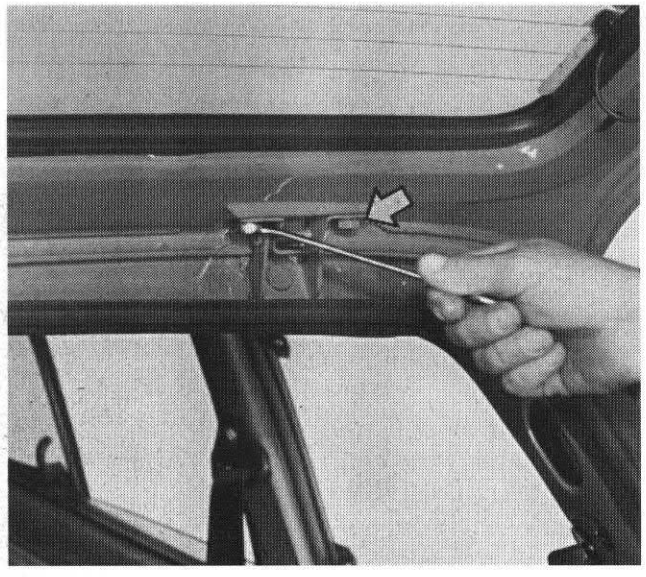
- Remove the safety clip fastening the damper to the tail-gate.

70.



P1V04AM01

- Remove the retaining ring and withdraw pins from hinges. Remove the tailgate from the car.
- Refit the tail-gate to the car by carrying out removal instructions in reverse order. Take care to insert the heated rear screen lead inside the frame first.



P1V04AM02

Removing-refitting hinge half from tail-gate

- Unscrew the bolts fixing the hinge half to the tail-gate.

P1V04AM03

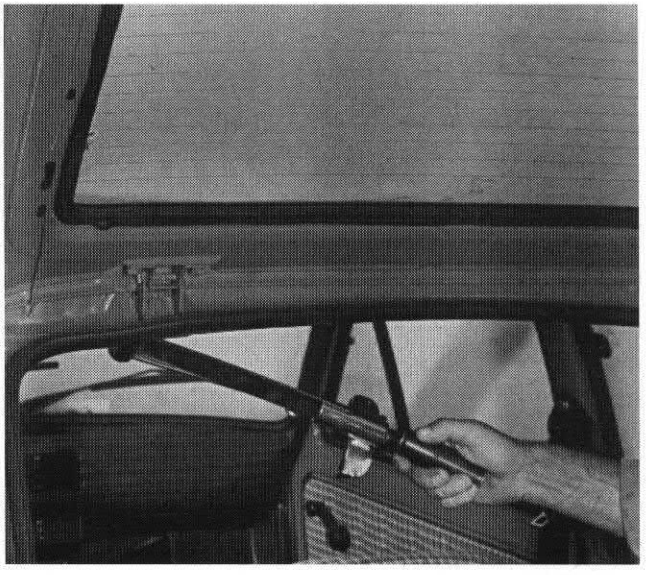
Removing-refitting hinge half from body shell

- Unscrew bolt fixing hinge half to body shell.

P1V05AM01

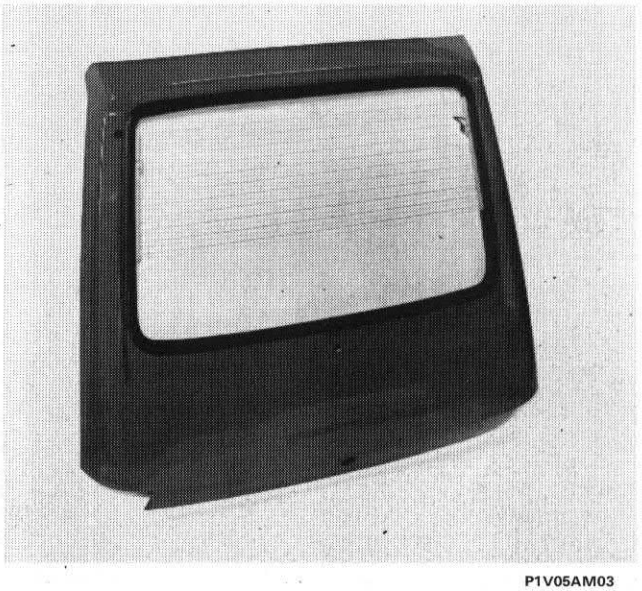
- When refitting the hinges, place sealant between the hinge halves and the body shell to prevent water leaking into the passenger compartment.

1,5 daNm



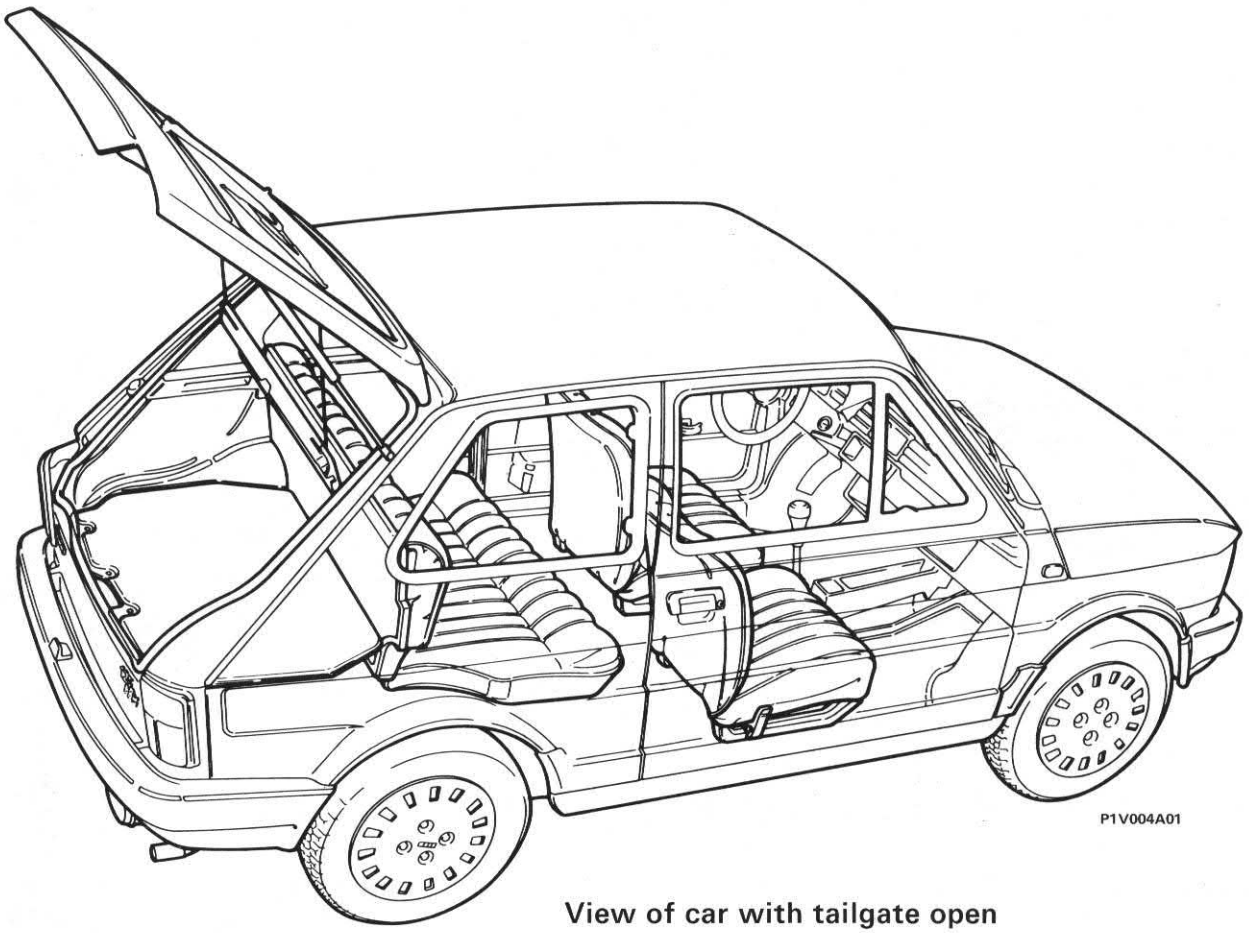
P1V05AM02

- Fit the tail-gate to the car by inserting the hinge pivot pin;
- Fit the retaining ring.
- Adjust the tail-gate position and tighten bolts fixing the hinge half to the body shell to the specified torque.

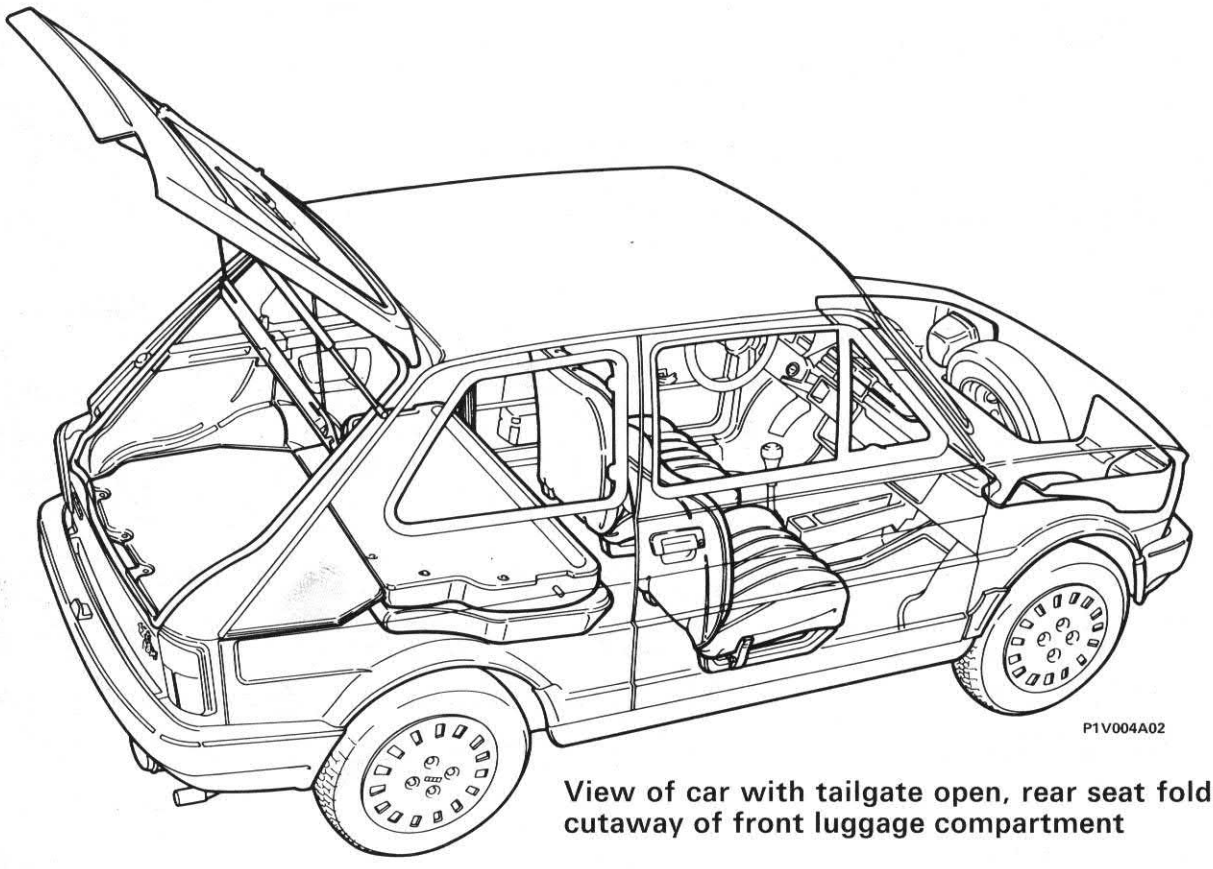


P1V05AM03

Tail-gate separated from car

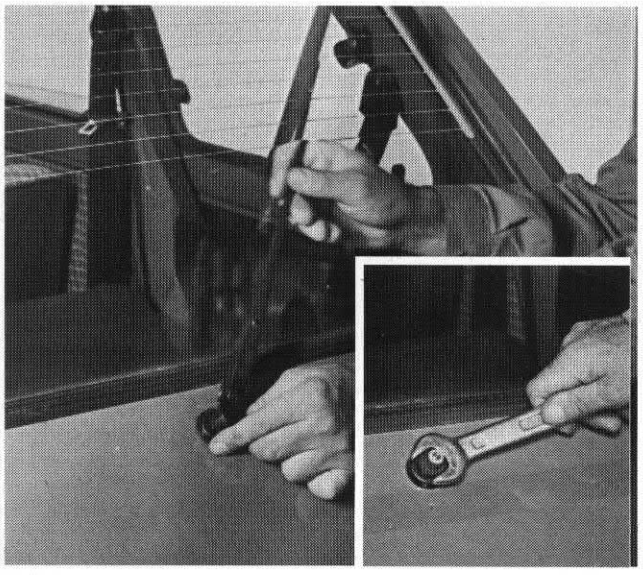


View of car with tailgate open



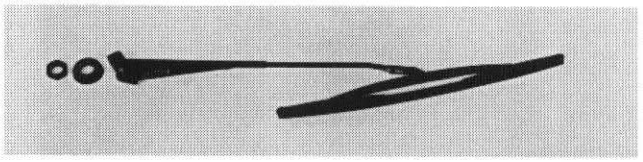
View of car with tailgate open, rear seat folded and cutaway of front luggage compartment

70.



P1V06AM01 P1V06AM02

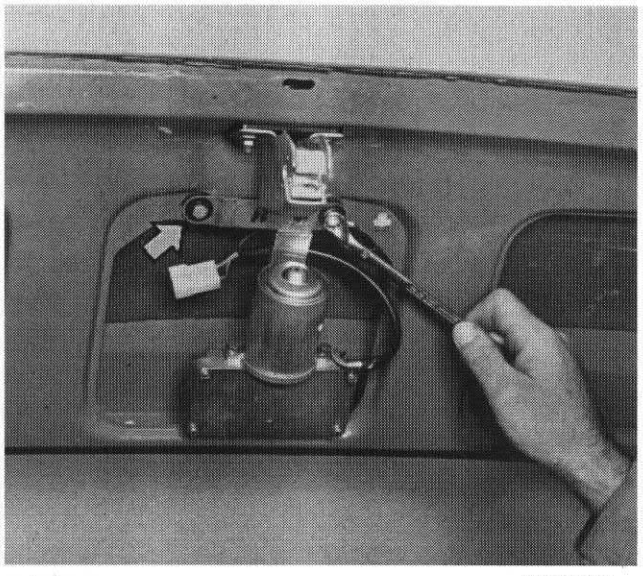
DISMANTLING - FITTING DEVICES FITTED TO TAIL-GATE



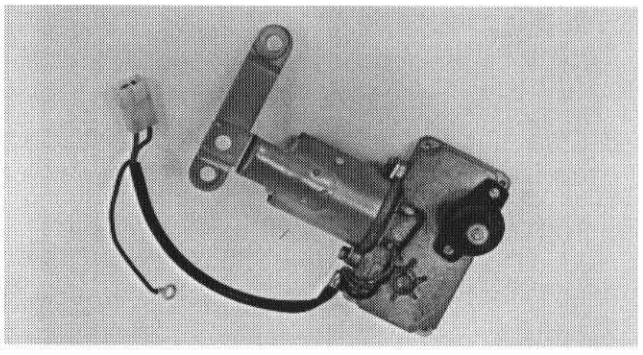
P1V06AM03

Removing-refitting rear wiper motor

- Disconnect battery negative lead.
- Disconnect rear wiper connector (see page 3)
- Remove the wiper blade as shown in the diagram.

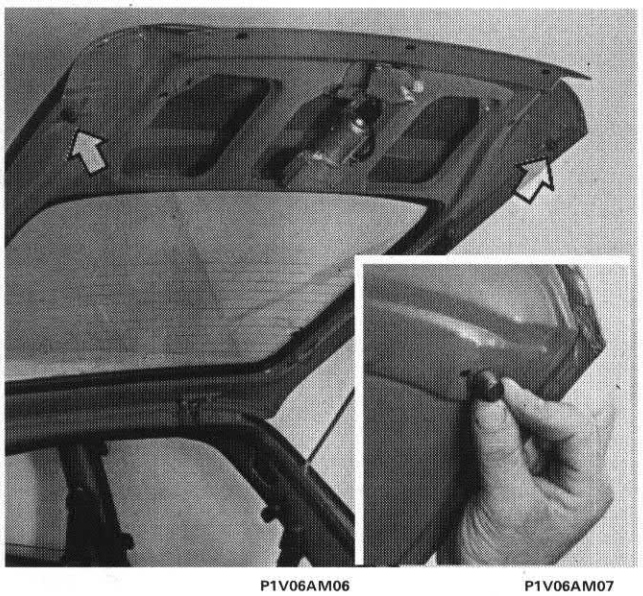


P1V06AM04



P1V06AM05

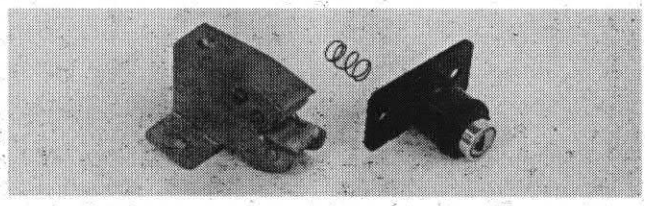
- Unscrew the rear wiper blade operating pin retaining nut.
- Unscrew the rear wiper motor retaining screws and remove unit from tail-gate.
- Refit the rear wiper motor by carrying out removal operations in reverse order.



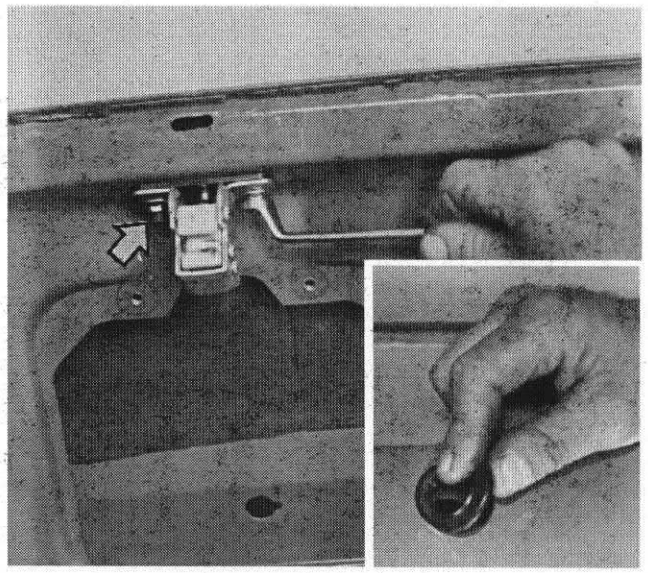
P1V06AM06 P1V06AM07

Removing-refitting tail-gate buffer pads.

NOTE *Adjust pad position when refitting.*



P1V07AM01



P1V07AM01

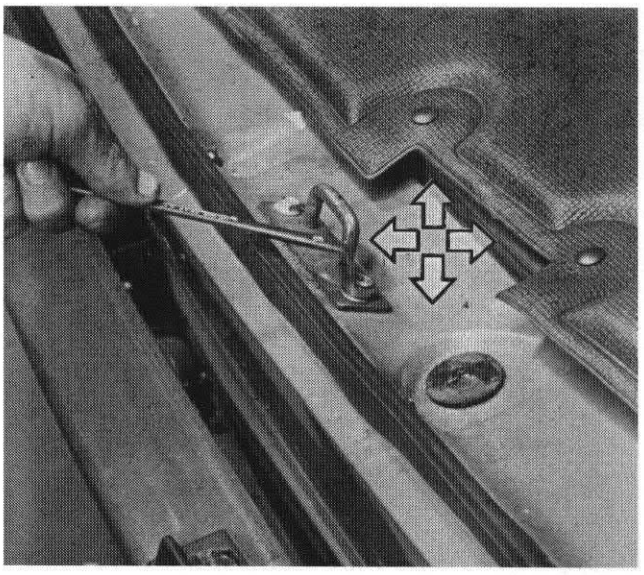
P1V07AM03

Removing-refitting tail-gate catch

- Check weather strip condition: replace if damaged.

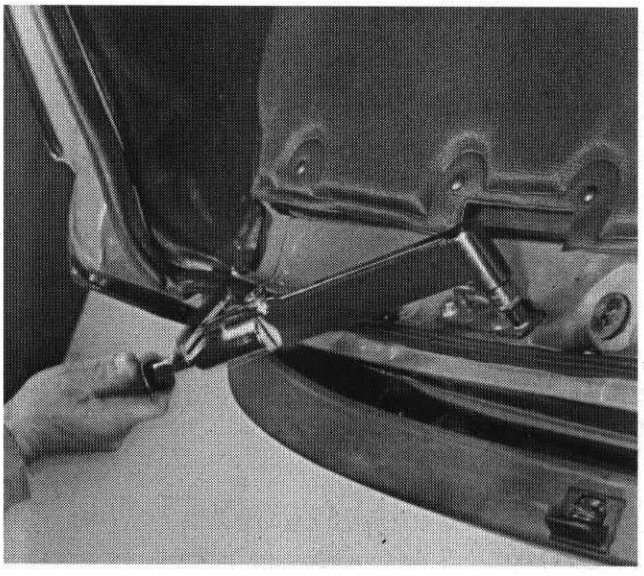
Adjusting tail-gate catch striker

NOTE *The arrows indicate permitted striker adjustment movements.*



P1V07AM04

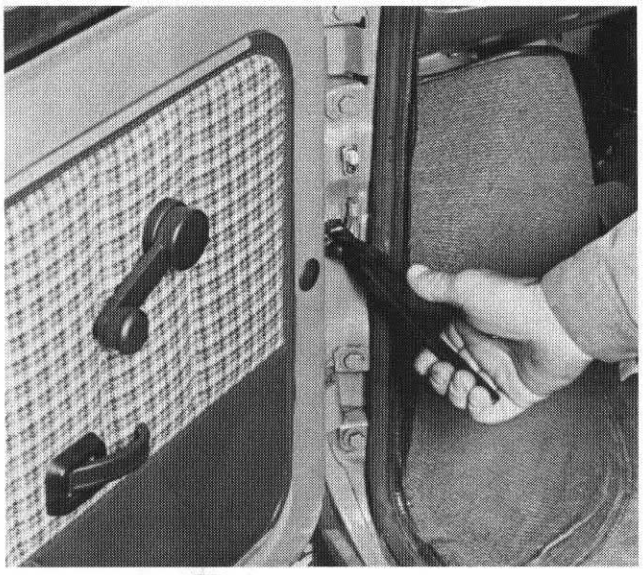
0,44 daNm



P1V07AM05

- Following adjustment, tighten retaining screws to specified torque

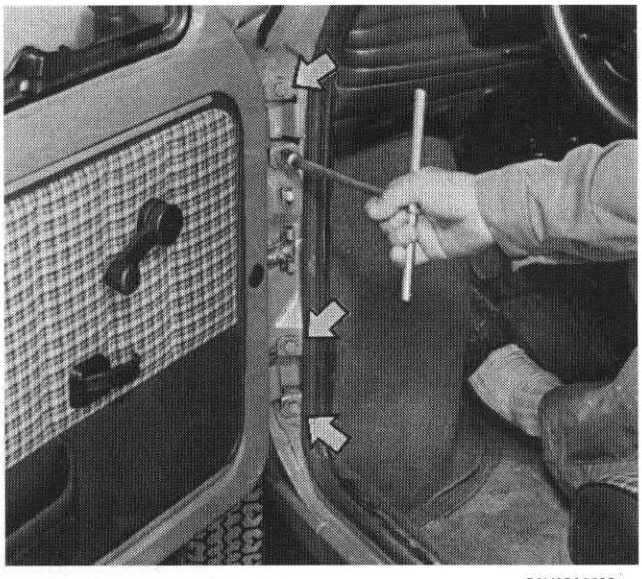
70.



P1V08AM01

REMOVING-REFITTING DOOR ASSEMBLY

- Disconnect the opening limit device as shown in the diagram.



P1V08AM02

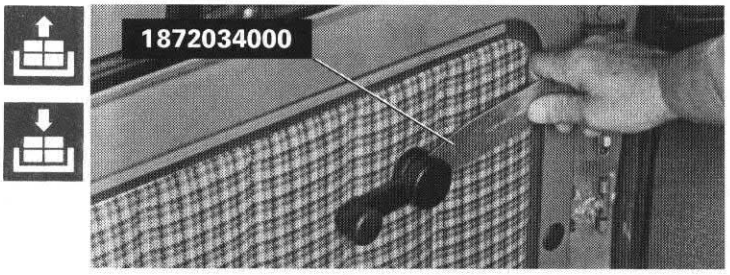
- Unscrew the four bolts fastening the hinge to the body shell and remove the door assembly.

P1V08AM03

1,5 daNm

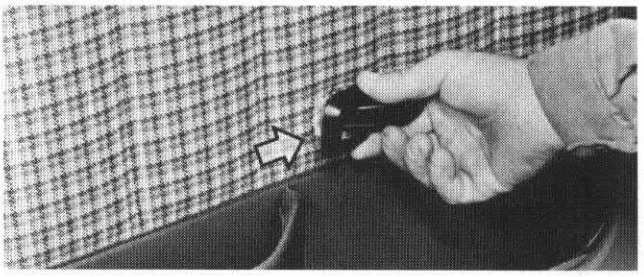
- Refit the door by carrying out removal operations in reverse order. Tighten bolts fixing hinges to body shell to the specified torque.

DISMANTLING – FITTING DEVICES FITTED TO DOOR

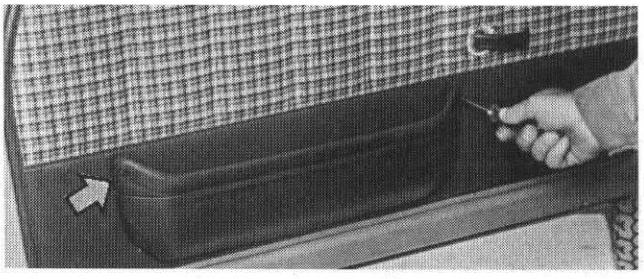


P1V09AM01

- Use tool 1872034000 to withdraw the retaining spring and remove the window opening handle.
- Remove the door opening plate in the direction indicated by the arrows as shown in the bottom box.

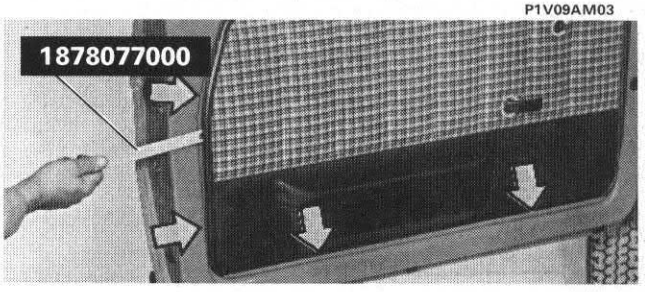


P1V09AM02

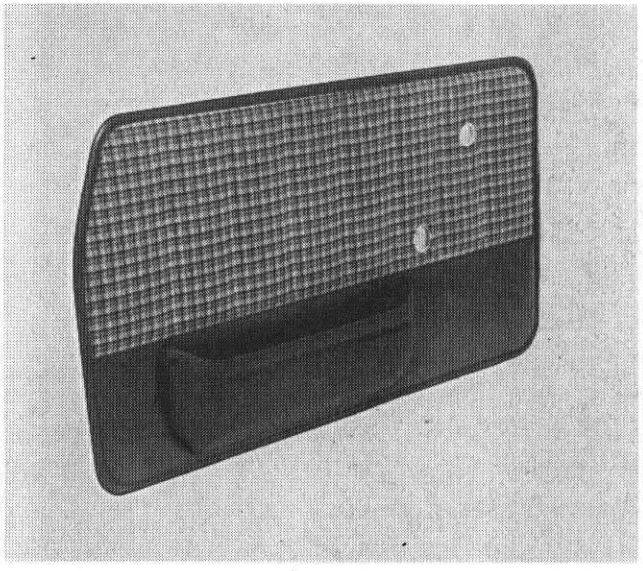


P1V09AM03

- Unscrew the two door panel fixing bolts as shown in the top box
- Using tool 1878077000, release the fastening studs round the outside of the door panel and remove.



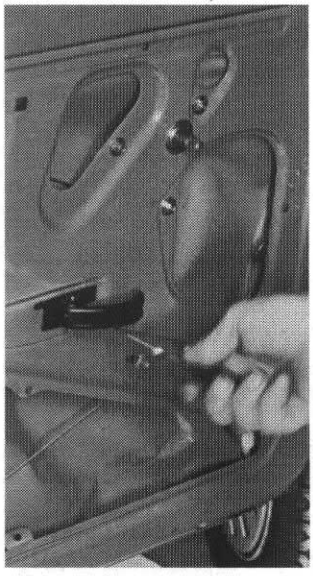
P1V09AM04

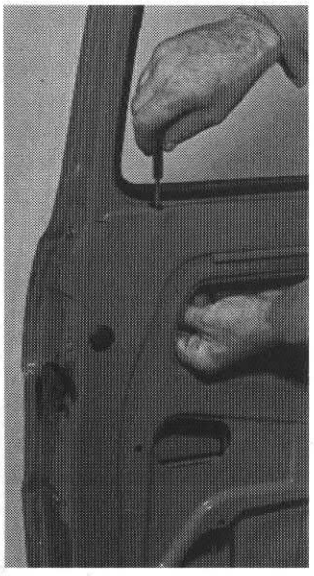


P1V09AM05

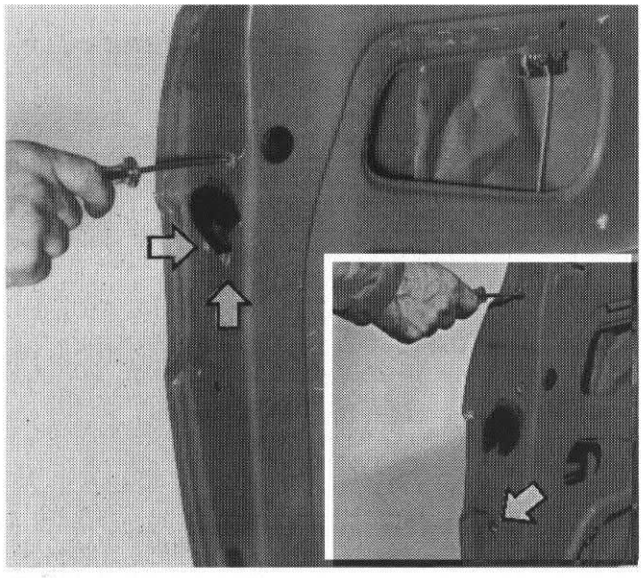
Door panel separated from car

70.


P1V10AM01


P1V10AM02

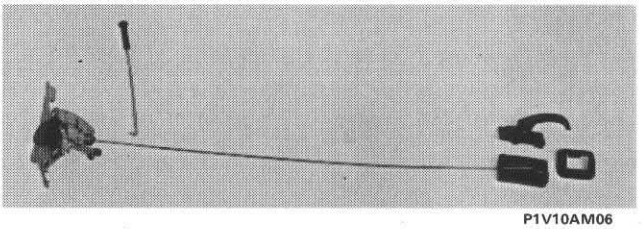
- Unscrew link fastening bolt and disconnect from door catch.
- Withdraw door closure safety rod and remove, operating from inside door frame.


P1V10AM03

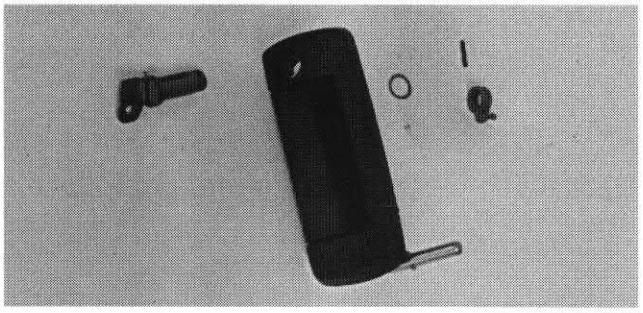
P1V10AM04

- Unscrew the two glass guide channel retaining screws indicated in the box.
- Unscrew the three door catch retaining screws.


P1V10AM05


P1V10AM06

- Push the door catch inside the door, then release the connecting link to the outer handle and remove the door catch.

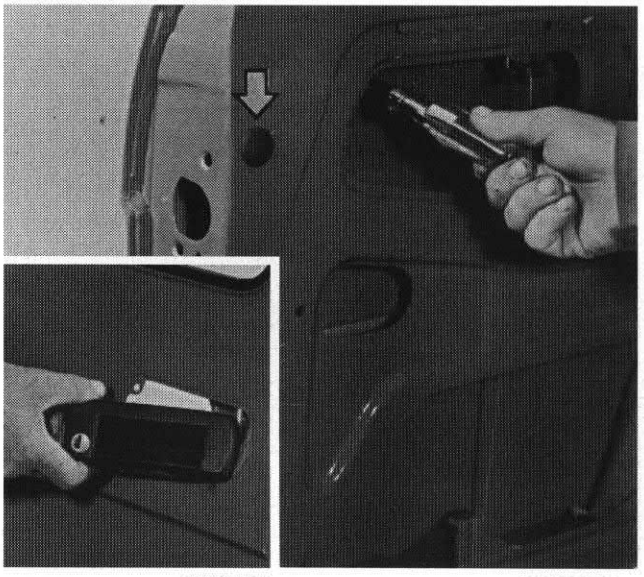


P1V11AM01

- Unscrew the two screws fixing the outer handle.

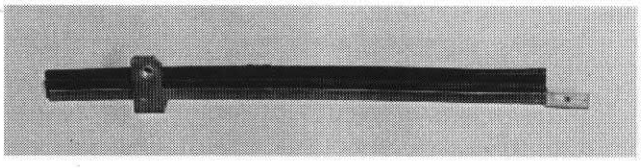
NOTE *Remove the plug shown in the diagram to reach one of the two screws.*

- Remove the outer door handle as shown in the box.



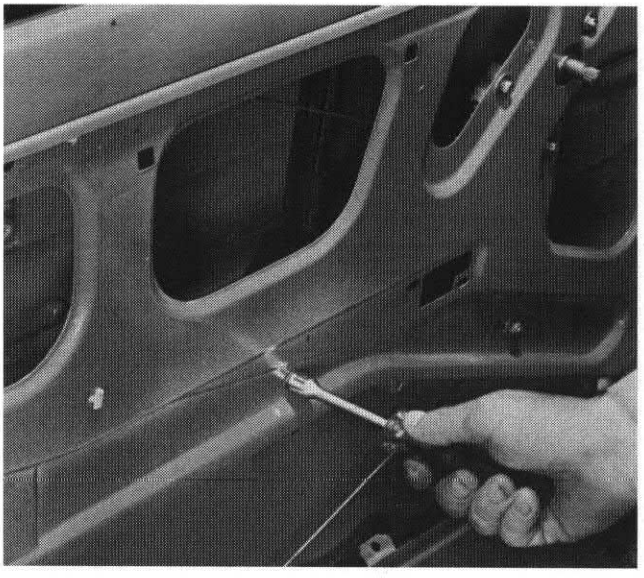
P1V11AM02

P1V11AM03



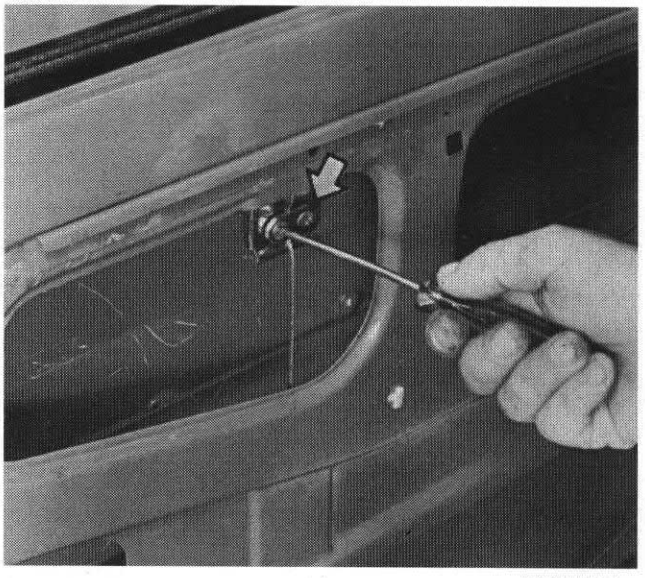
P1V11AM05

- Unscrew the retaining screw and withdraw the front glass guide channel.



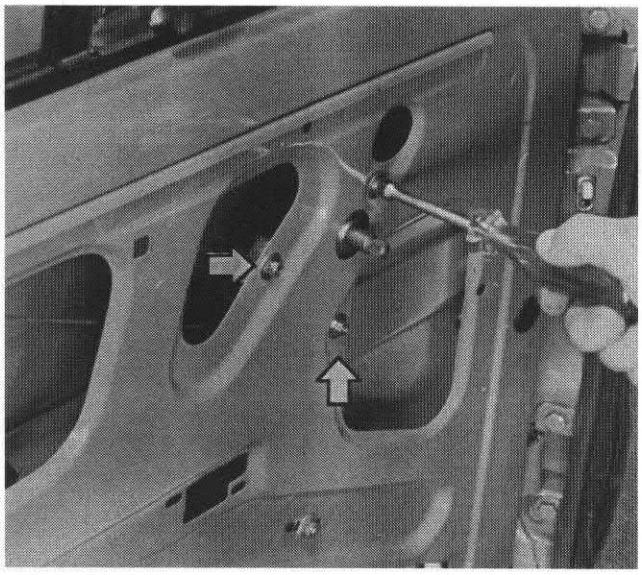
P1V11AM04

- Unscrew the two screws fixing the glass link.

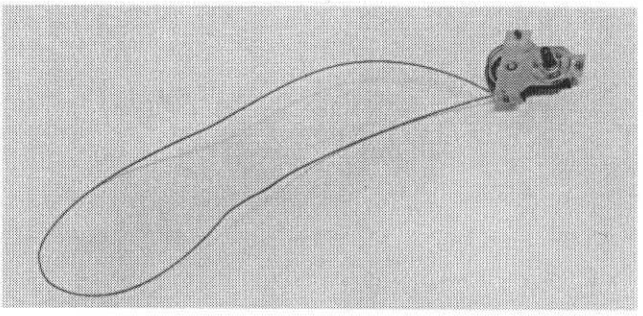


P1V11AM06

70.

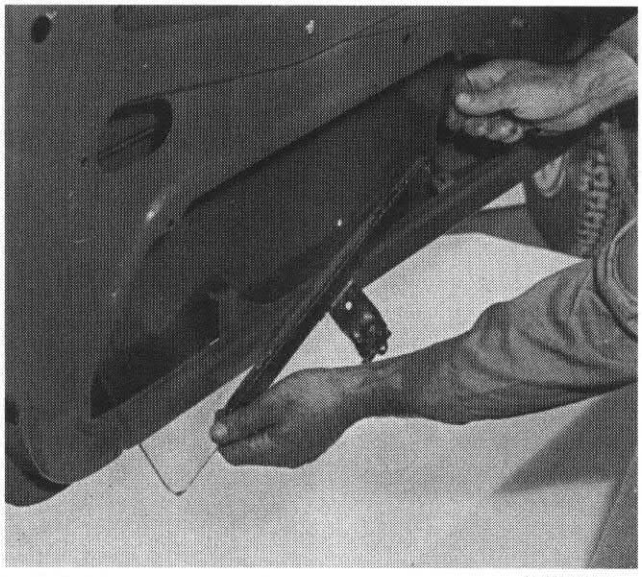


P1V12AM01

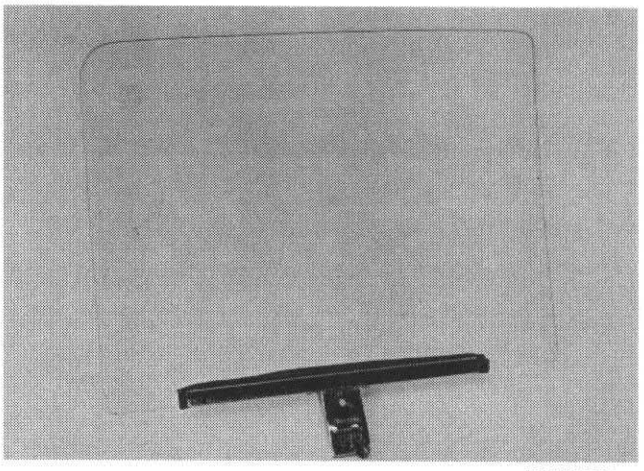


P1V12AM02

- Loosen the bottom nut fixing the mechanical window device. Unscrew the three nuts indicated by arrows and remove the manual window device.

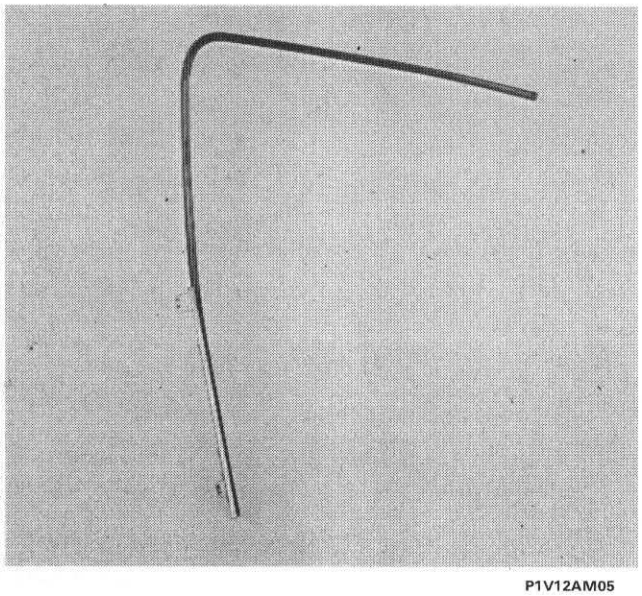


P1V12AM03



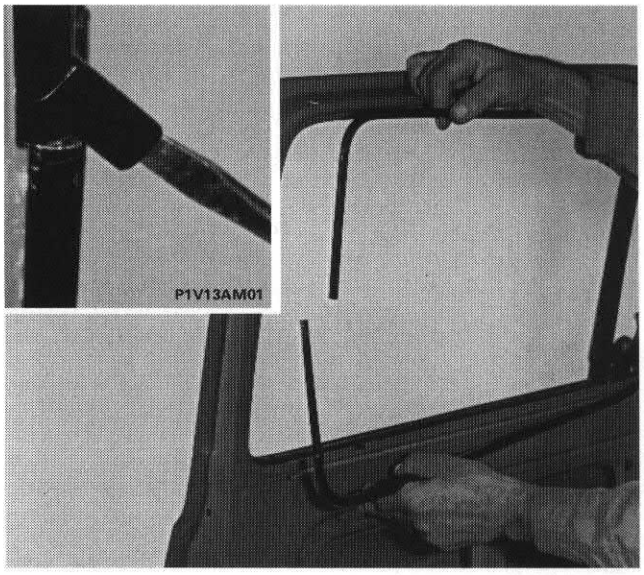
P1V12AM04

- Withdraw the glass from the bottom of the door.
- Extract the rear glass guide channel.



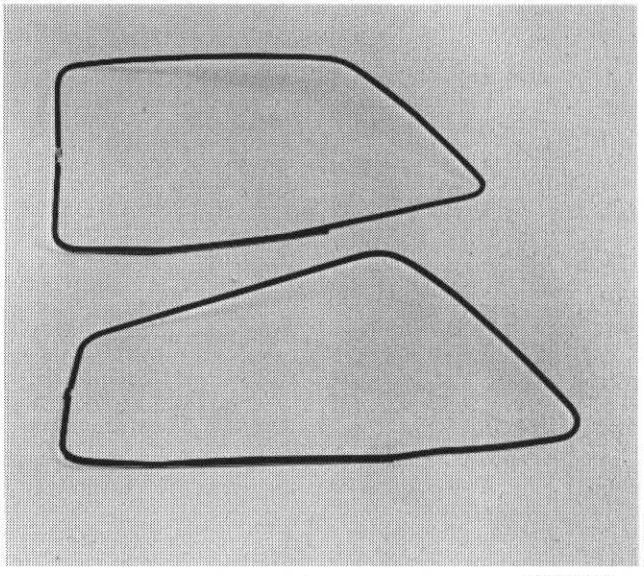
P1V12AM05

Rear glass guide channel separated from car



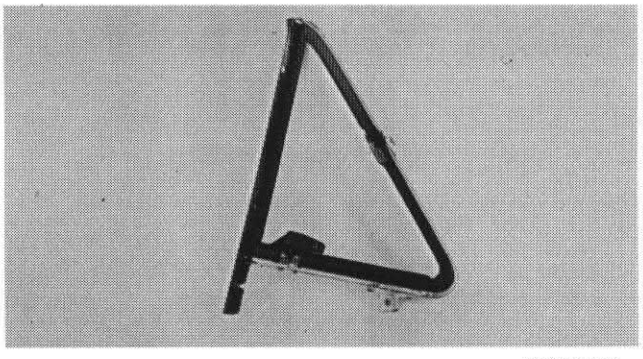
P1V13AM02

- Prise off the seal cover plate as shown in the box.
- Remove the inner window frame.



P1V13AM03

Window glass outer and inner frames

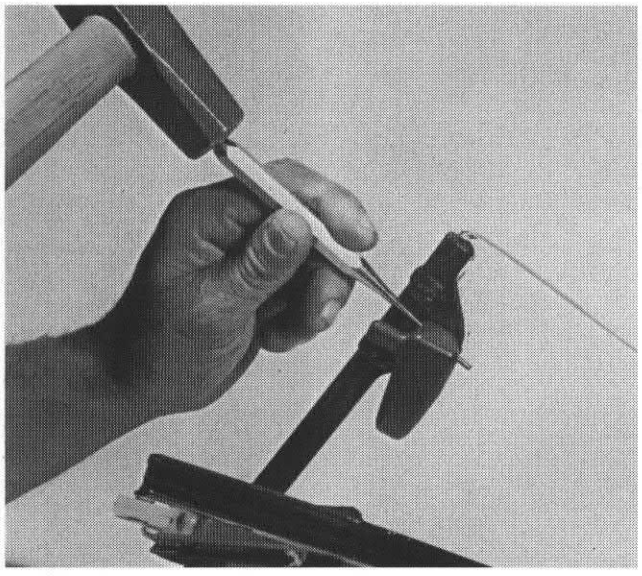


P1V13AM05

P1V13AM04

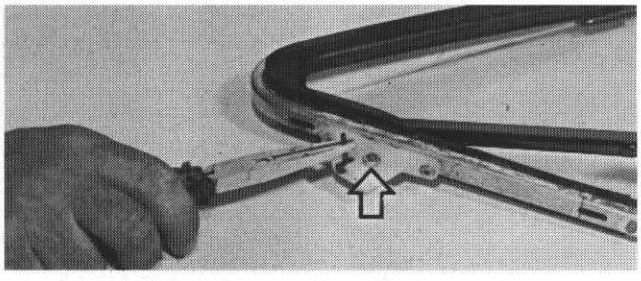
- Unscrew the two retaining screws and remove the deflector.

70.

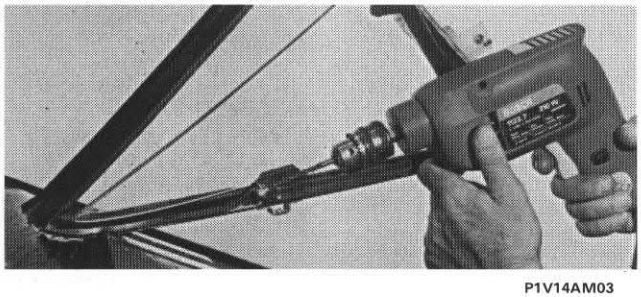


P1V14AM01

- Remove the retaining pin using a drift and remove the deflector closure rod.

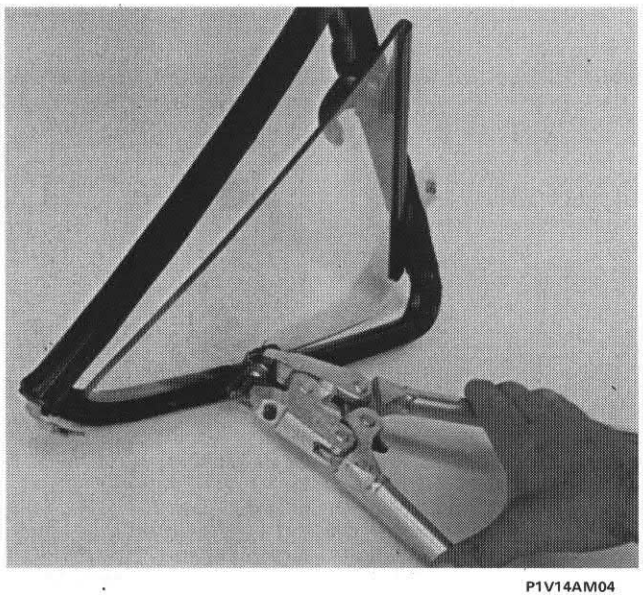


P1V14AM02



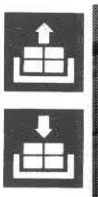
P1V14AM03

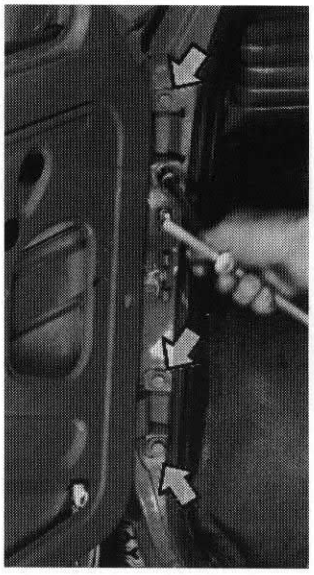
- Remove the two fixing rivets and loosen the arrowed screw.
- Remove the glass end stop pin as shown in the top box.
- Remove the deflector pin, as shown in the bottom box.



P1V14AM04

- Remove the deflector pin using special rivet pliers.

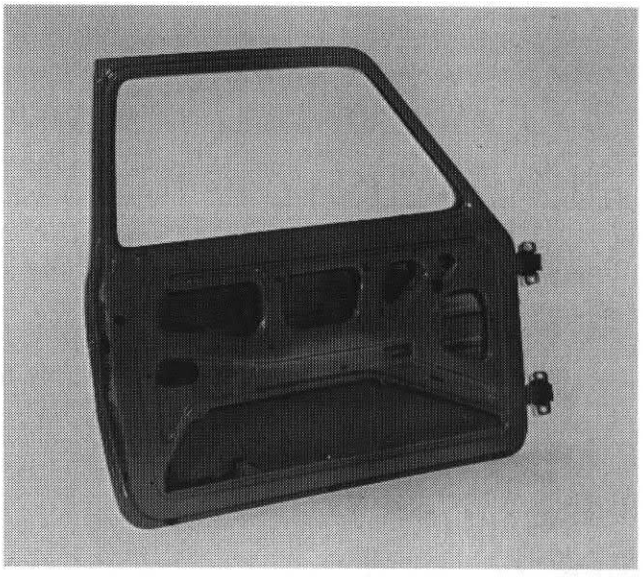




P1V15AM02

P1V15AM01

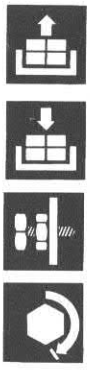
- Remove the door open limit device.
- Unscrew the four bolts fastening the hinges to the body shell.
- Remove the door.

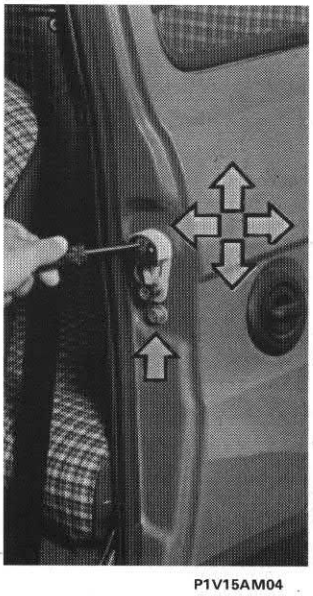


P1V15AM03

Door frame assembly

Adjusting door catch striker





P1V15AM04

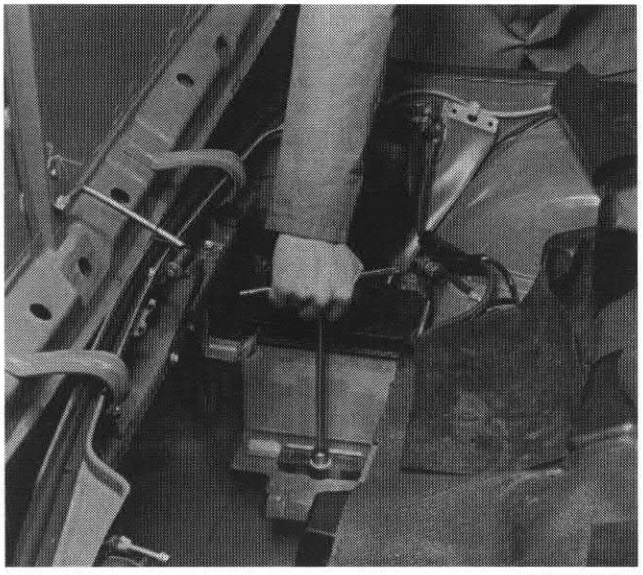
P1V15AM05

- Unscrew the two fixing bolts and remove the door catch striker.
- When refitting, screw in the retaining screws without tightening.

NOTE *The arrows indicate permitted striker adjustment movements*

1,8 daNm

- Following adjustment, tighten the striker retaining screws.
- Remount and refit the door by carrying out removal operations in reverse order. Tighten hinge retaining screws to the specified torque.



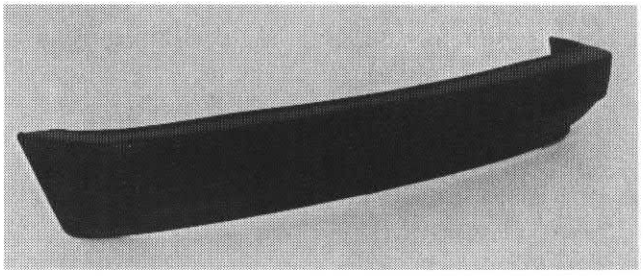
P1V16AM01

FRONT BUMPERS

Removing-refitting

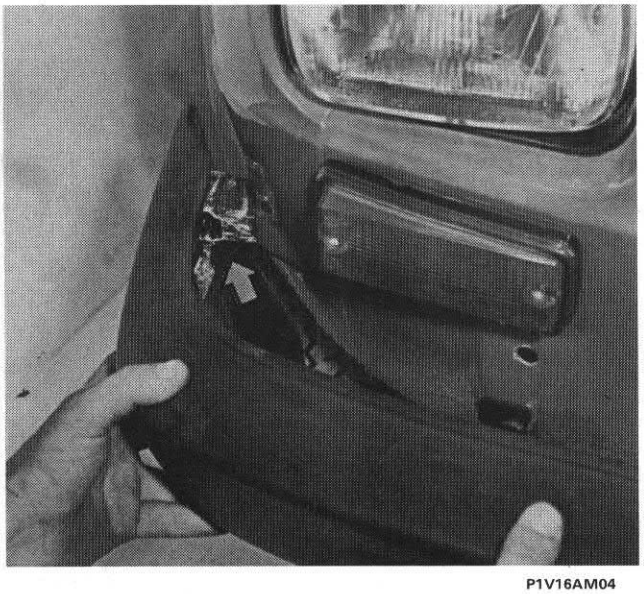
- Disconnect the battery terminals and remove.

P1V16AM02



P1V16AM03

- Unscrew the two screws fastening the bumpers to the body shell and remove.

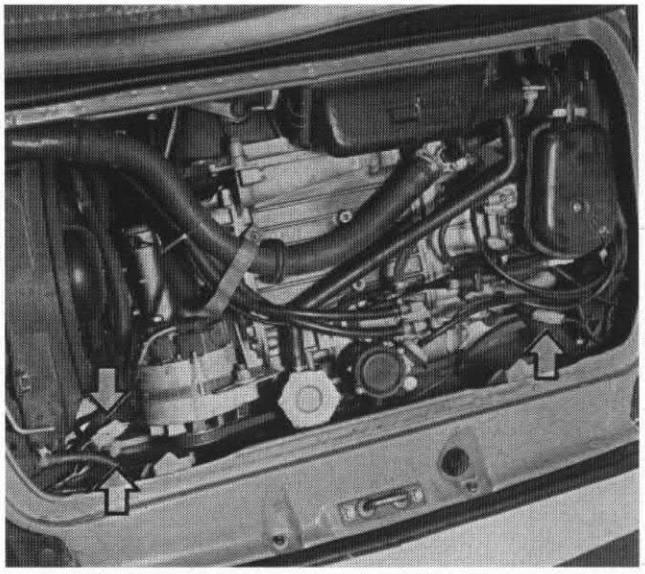


P1V16AM04

- Refit the bumpers by carrying out removal instructions in reverse order.

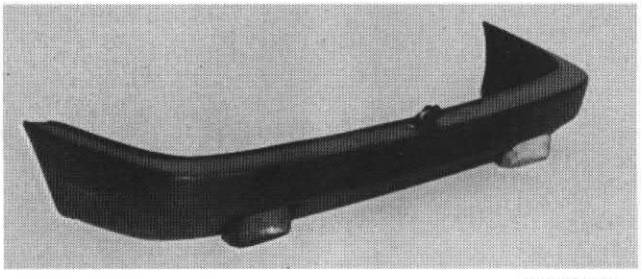
Position the bumpers on the guides located at the sides.

REAR BUMPERS

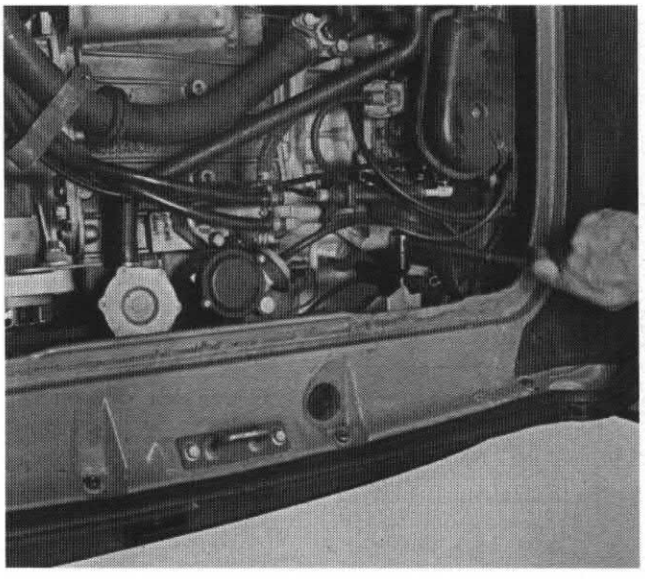


P1V17AM01

- Disconnect the three connectors indicated in the diagram.

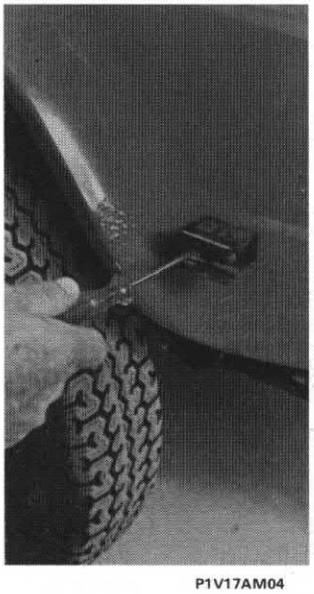


P1V17AM02

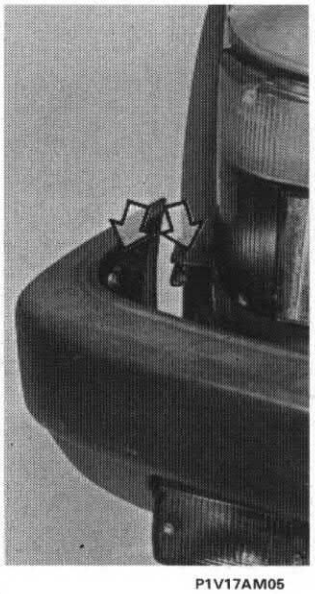


P1V17AM03

- Unscrew the two internal screws fastening the brackets to the body shell.
- Remove the bumpers together with the reversing, rear fog and number plate lights.



P1V17AM04

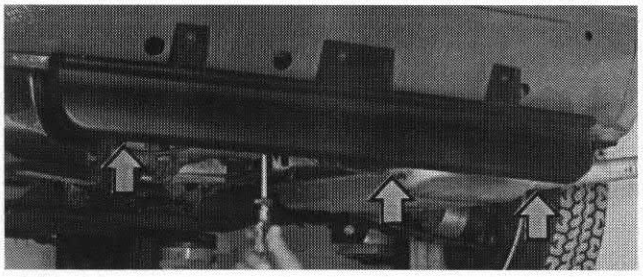


P1V17AM05

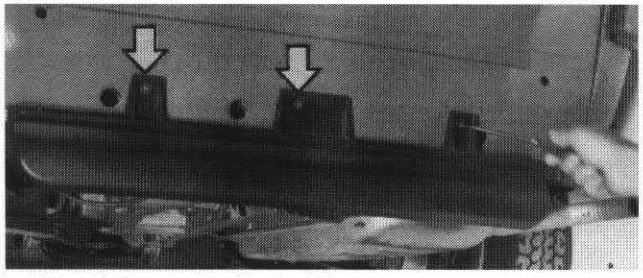
- Unscrew the retaining screws and remove the side guides for fastening the rear bumper.
- Refit the bumper by carrying out removal instructions in reverse order.

Position the bumper on the guides located at the sides.

70.

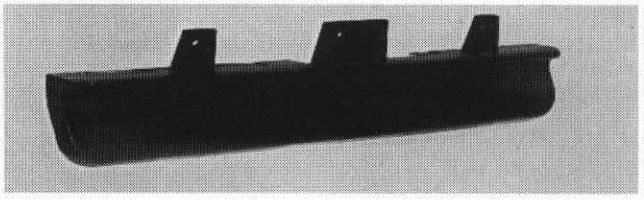


P1V18AM01



P1V18AM02

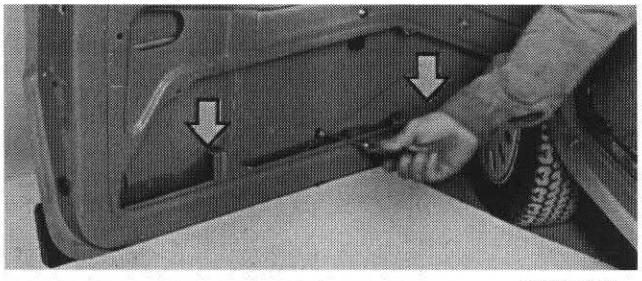
PROTECTIVE REAR MOULDING (located under rear bumper)



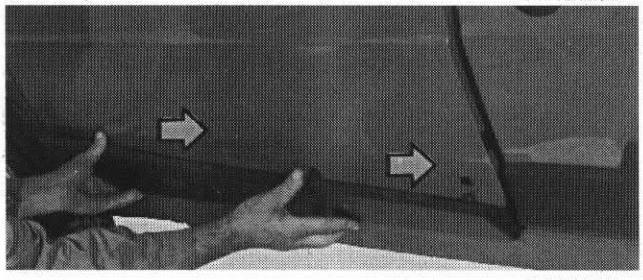
P1V18AM03

Removing-refitting.

- Remove the rear bumper (see previous page), then unscrew the four bottom screws and three front screws fastening the moulding and remove.
- Refit the protective moulding by carrying out removal instructions in reverse order.



P1V18AM04



P1V18AM05

DOOR SIDE RUBBING STRIPS

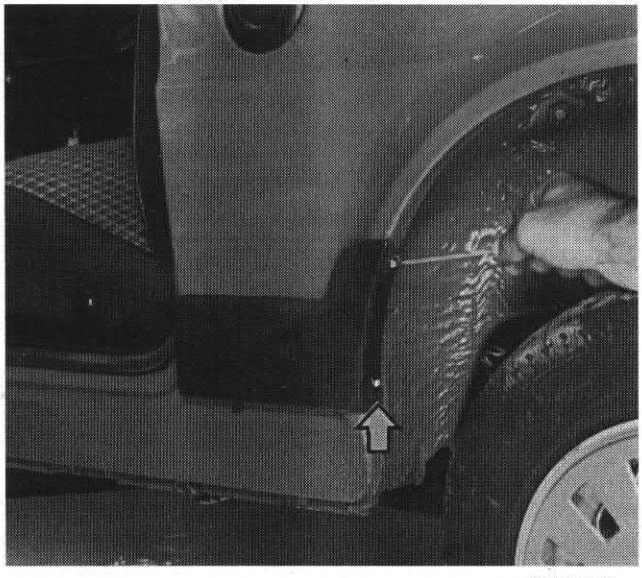
Removing-refitting

- Remove the door trim panel (see page 9).
- Unscrew the central retaining screw and undo the two studs arrowed in the top box.
- Disconnect the rubbing strips.

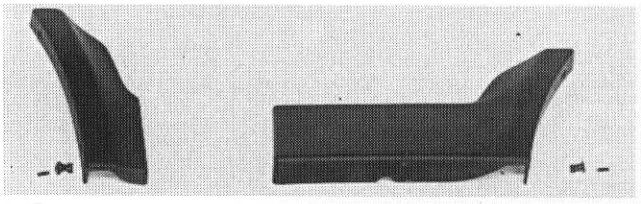
NOTE *To remove easily, slide the strips toward the back of the car to release from the retaining clips.*

- Refit the strips by carrying out removal operations in reverse order.

SIDE RUBBING STRIPS IN BODY SHELL



P1V18AM06

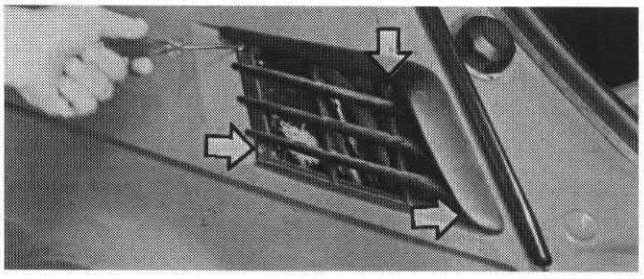


P1V18AM07

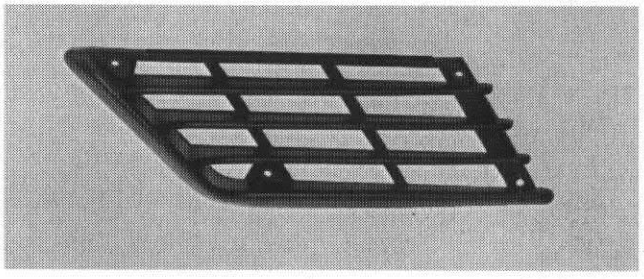
Removing-refitting.

- Remove the tapered peg from the fastening studs using a punch.
- Slide the strip toward the back of the car and remove.
- Carry out the same procedure for the front strip.
- Refit the strips by carrying out removal instructions in reverse order.

SIDE GRILLES



P1V19AM01



P1V19AM02

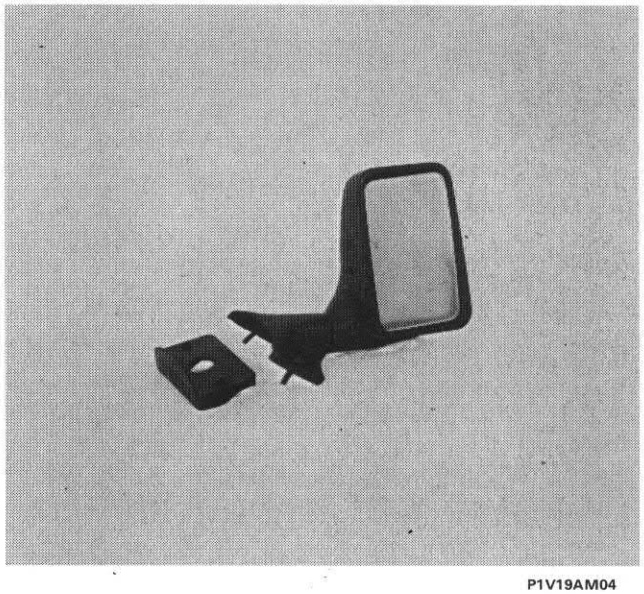
Removing-refitting

- Unscrew the four retaining screws and remove the side grille.
- Refit the grille by carrying out removal instructions in reverse order.

DOOR MIRROR

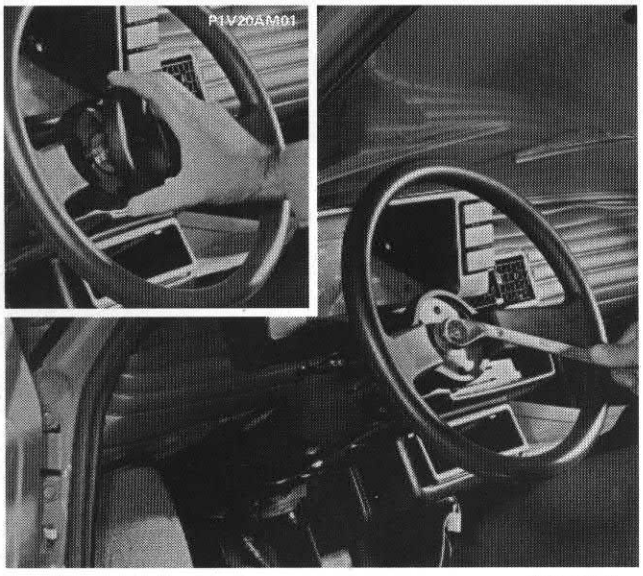
P1V19AM03

Removing-refitting



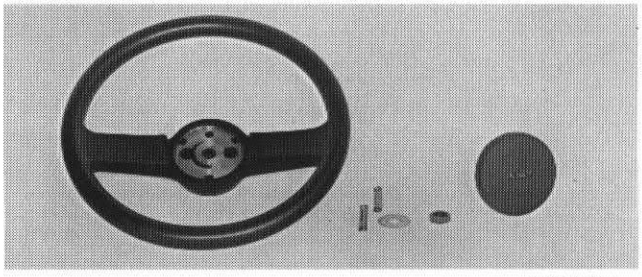
P1V19AM04

Door mirror assembly



P1V20AM02

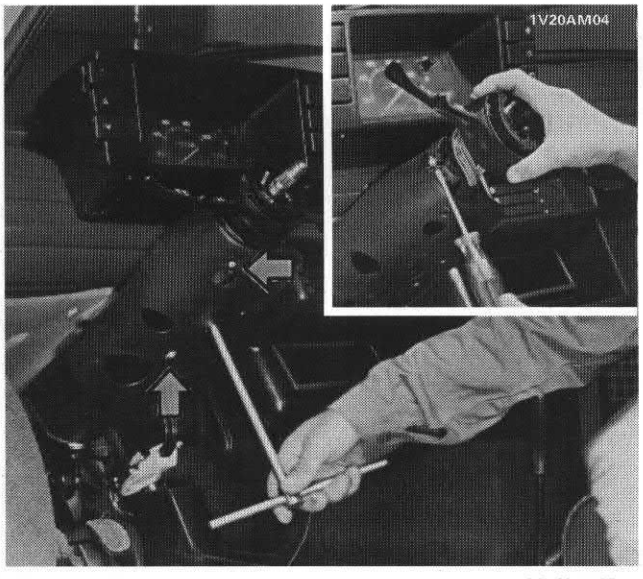
STEERING WHEEL AND LOCK RELEASE



P1V20AM03

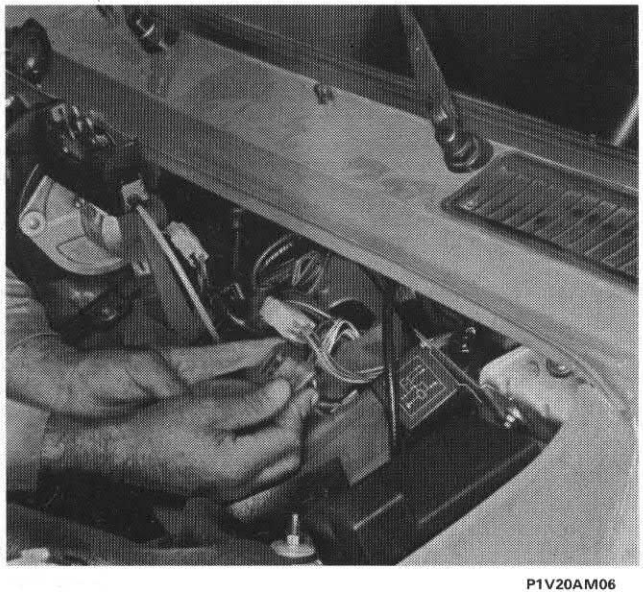
Removing-refitting

- Remove the horn cover as shown in the box.
- Unscrew the nut fastening the steering wheel to the steering column.
- Remove the steering wheel.

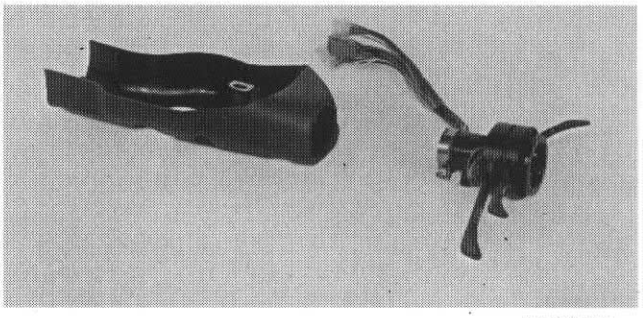


P1V20AM05

- Unscrew the nut and the two retaining screws indicated by the arrows.
- Loosen the collar tightening screws as shown in the box.



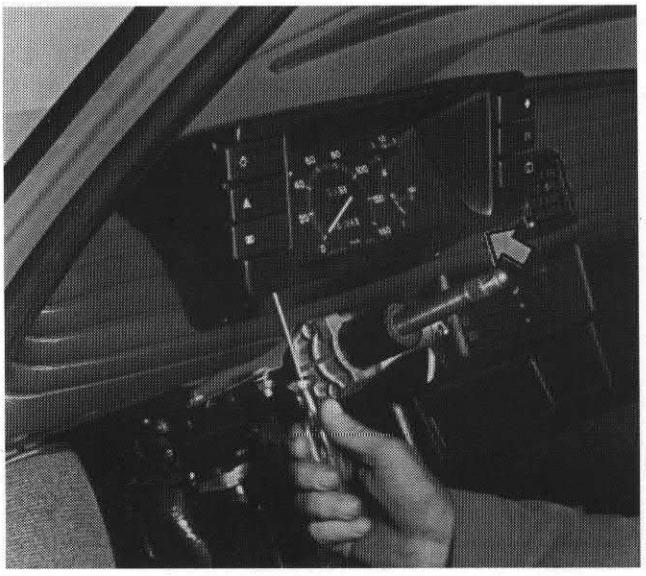
P1V20AM06



P1V20AM07

- Disconnect the three connectors located in the front luggage compartment and then pull off the steering lock release unit.

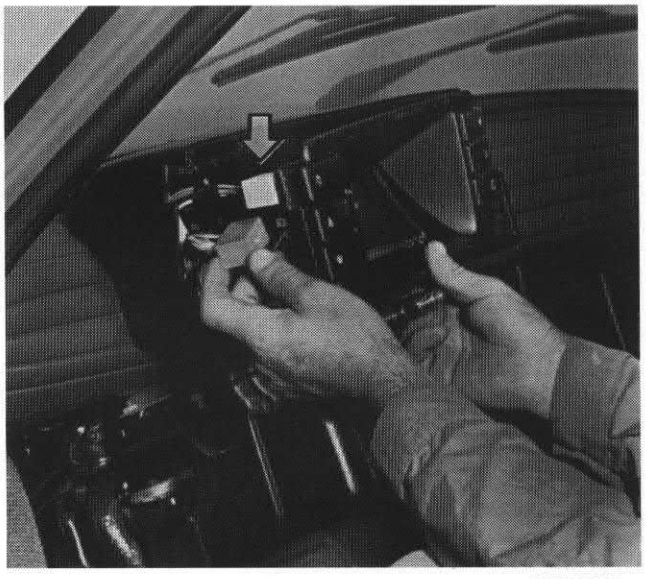
INSTRUMENT PANEL



P1V21AM01

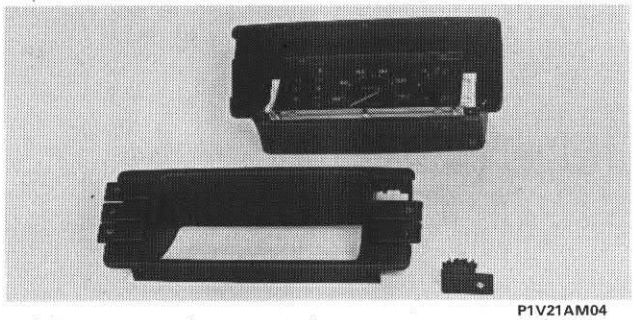
Removing-refitting

- Remove the wheel as shown on the previous page.
- Unscrew the two screws shown in the diagram.



P1V21AM02

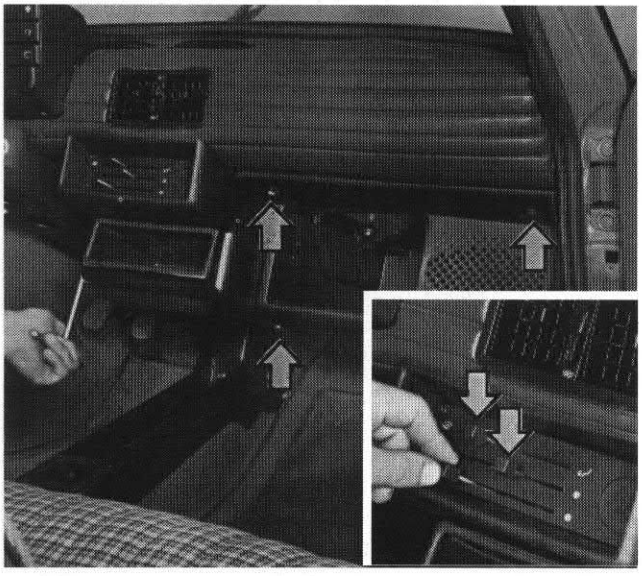
- Disconnect the connectors indicated and remove the instrument panel frame complete with switches.



P1V21AM04

- Unscrew the two instrument panel retaining screws, then take the two arrowed cable bundles out of the panel.
- Disconnect the connectors from the back of the instrument panel and remove from the facia.
- Refit the instrument panel by carrying out removal instructions in reverse order.

P1V21AM03

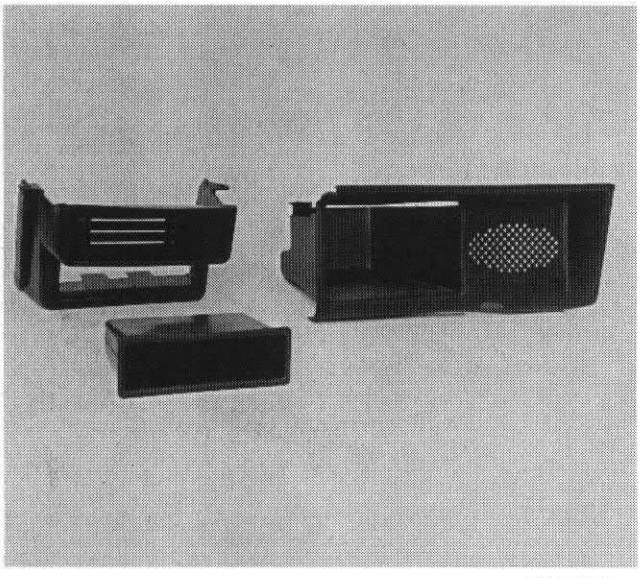


P1V22AM01 P1V22AM02

CENTRAL CONSOLE

Removing-refitting.

- Remove the heating and ventilation lever knobs as shown in the box.
- Unscrew the nut and the three screws indicated by the arrows.
- Remove the glove compartment with speaker compartment, central console and radio compartment.



P1V22AM03

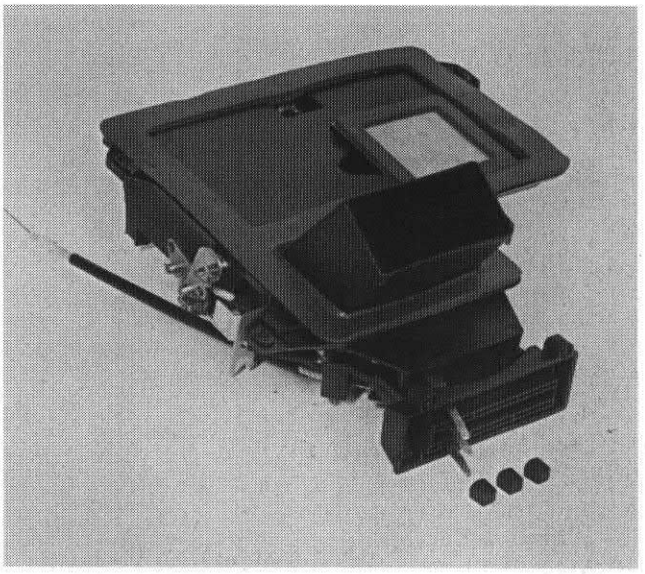
Glove compartment, central console and radio compartment.

P1V22AM04

HEATER CONTROL UNIT

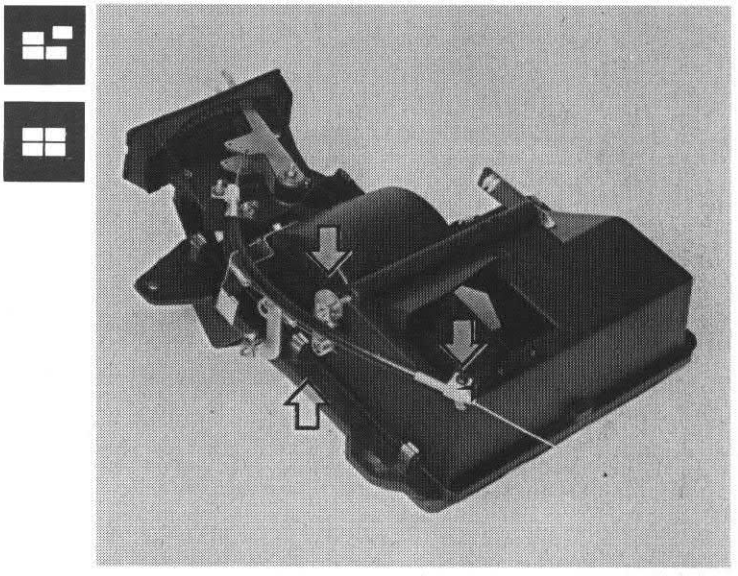
Removing-refitting.

- Remove the glove compartment and central console as described in the previous paragraph.
- Disconnect the link by loosening the retaining screw as shown in the diagram
- Unscrew the two screws and nuts indicated by the arrows.
- Remove the heater control block from the car.



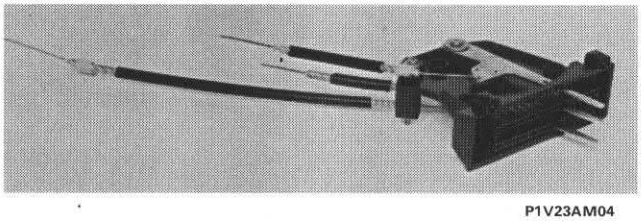
P1V23AM01

Heater control unit

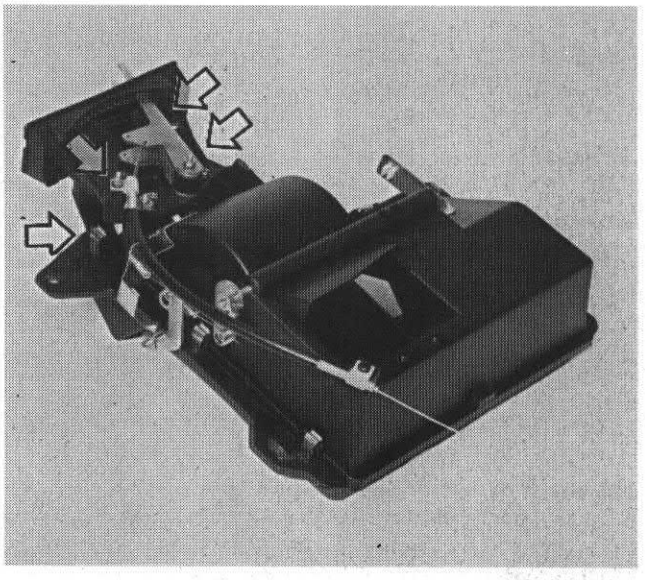


P1V23AM02

- Loosen the three control links at the points indicated by the arrows.



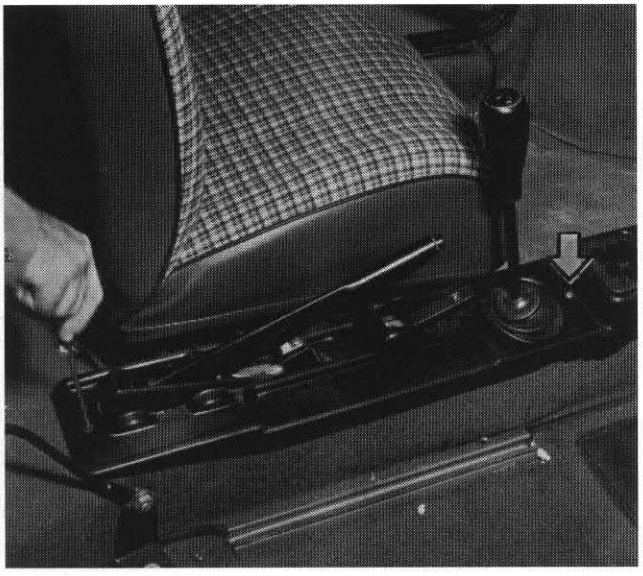
P1V23AM04



P1V23AM03

- Unscrew the four arrowed screws and remove the control lever unit.
- Refit the control lever unit and heater control block by reversing the removal procedure.

70.



P1V24AM01

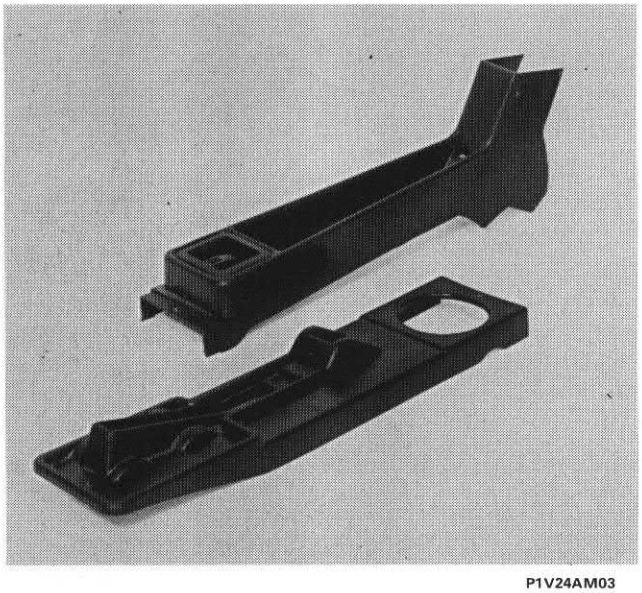
CENTRAL TUNNEL COVER

Removing-refitting.

- Unscrew the two retaining screws shown in the diagram and remove the rear cover.

P1V24AM02

- Unscrew the two screws shown in the diagram and remove the front glove compartment.

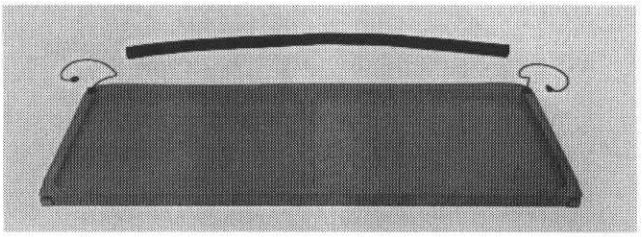


P1V24AM03

Tunnel cover

- Refit the tunnel cover by reversing the removal procedure.

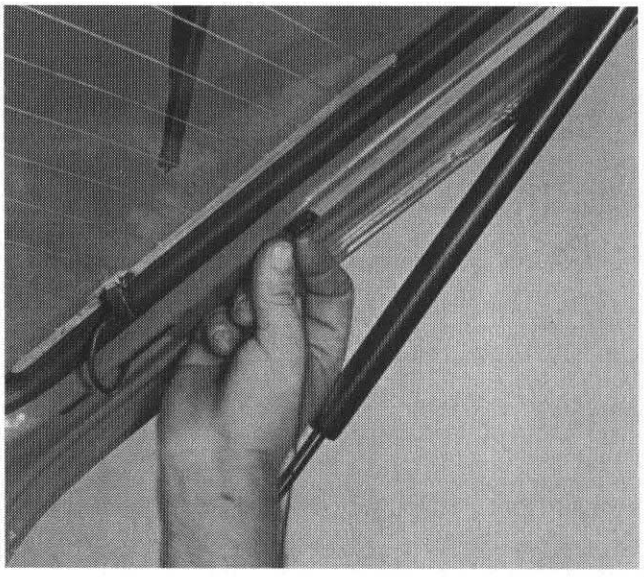
HAT RACK AND REAR SQUAB RELEASE



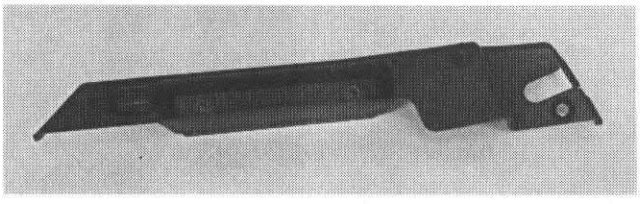
P1V25AM02

Removing-refitting

- Disconnect the tail-gate support link rings.
- Disengage the hat rack from the pins and withdraw.



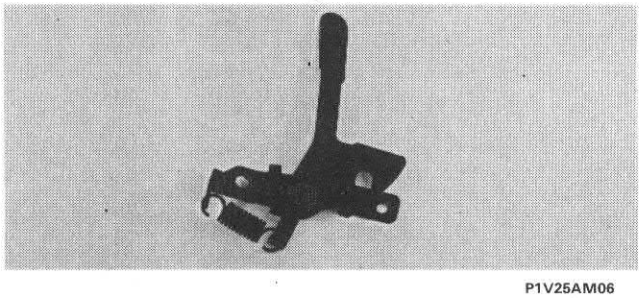
P1V25AM01



P1V25AM04

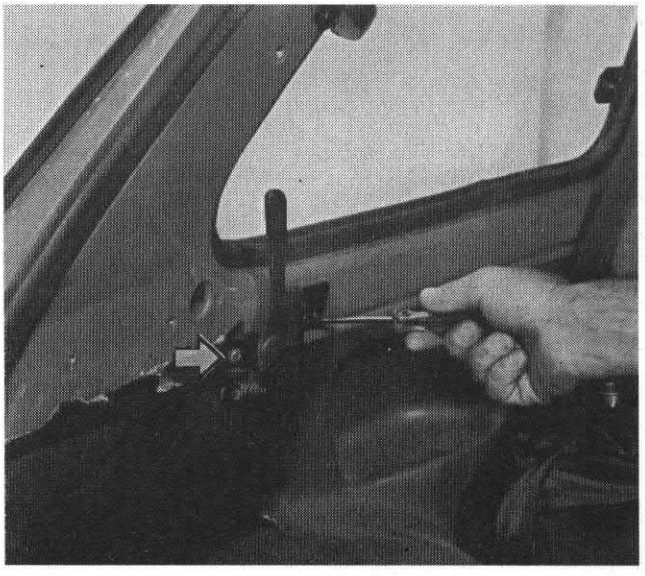
- Unscrew the two screws indicated and remove the hat rack support trim.

P1V25AM03

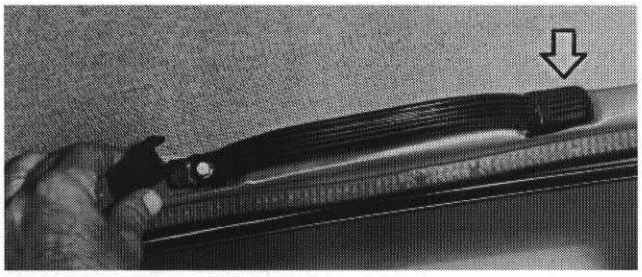


P1V25AM06

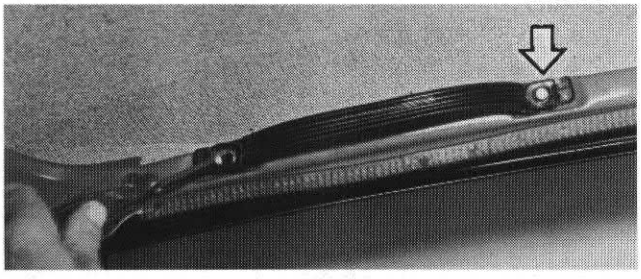
- Unscrew the two screws indicated and remove the rear squab release.
- Refit the hat rack by reversing the removal procedure.



P1V25AM05



P1V26AM01

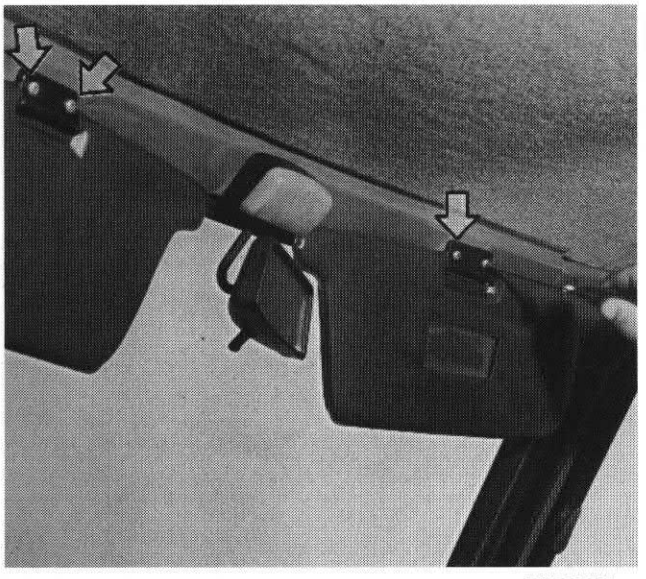


P1V26AM02

PASSENGER GRAB HANDLE

Removing-refitting

- Prise off the cover plate and unscrew the two retaining screws. Remove the passenger grab handle.

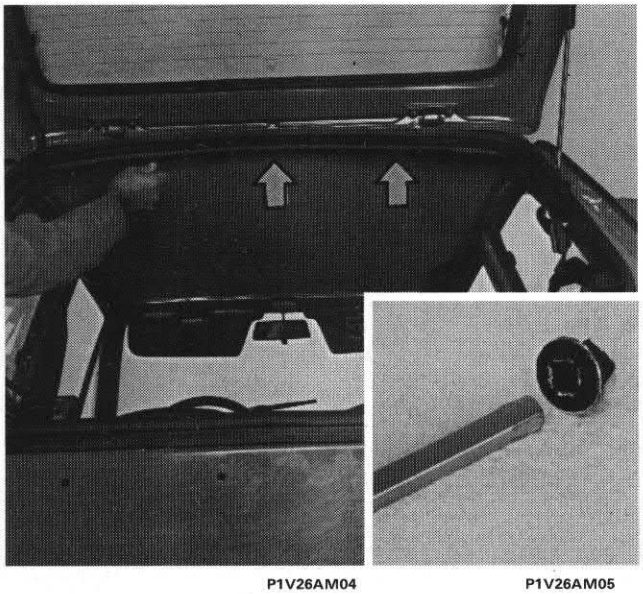


P1V26AM03

ROOF PANEL

Removing-refitting

- Remove the sun visors by unscrewing the four retaining screws indicated.



P1V26AM04

P1V26AM05

- Unscrew the three rear threaded plugs shown in the diagram using a suitable wrench as shown in the box.
- Detach and remove the roof panel, working through the tail-gate opening.
- Refit by reversing the removal procedure.

FRONT SEAT

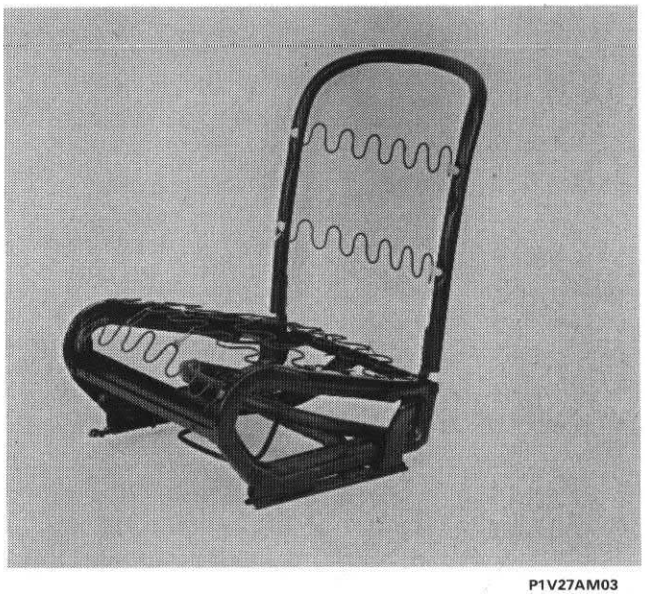
P1V27AM01

Removing-refitting

- Push the seat fully forward and release from guide rail.

P1V27AM02

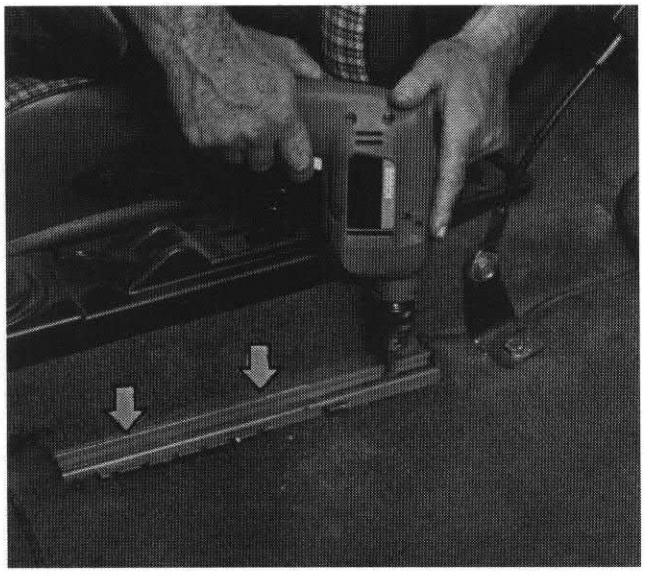
Front seat assembly.



P1V27AM03

- Remove the seat cover and padding.

70.



P1V28AM01

Removing-refitting guides

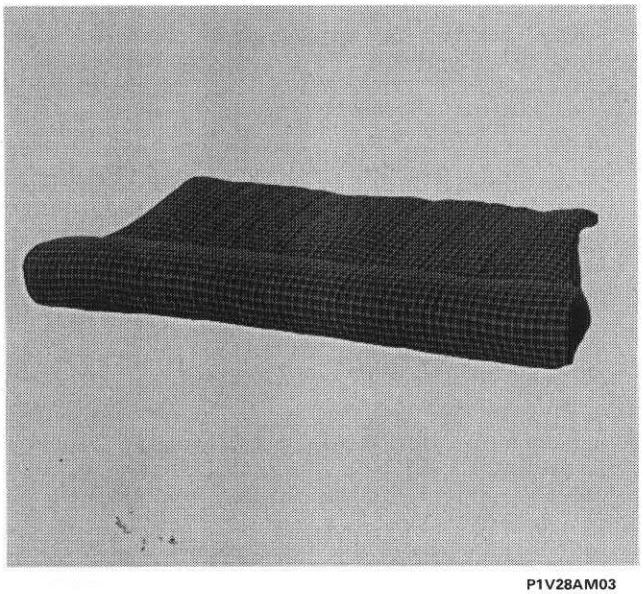
- Remove the four guide rail retaining rivets as shown in the diagram.
- Remount and refit the front seat by reversing removal and disassembly procedure.

P1V28AM02

REAR SEAT

Removing-refitting

- Lift the back seat cushion by releasing from stops and withdraw.



P1V28AM03

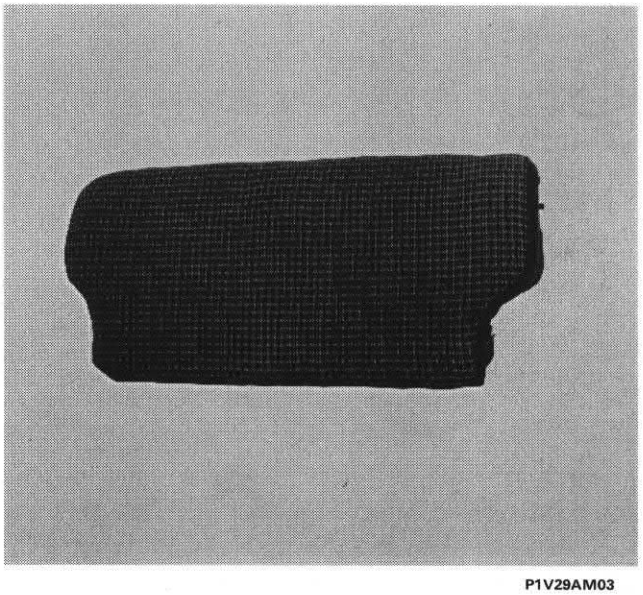
Back seat cushion

P1V29AM01

- Release the rear squab by means of the release lever.

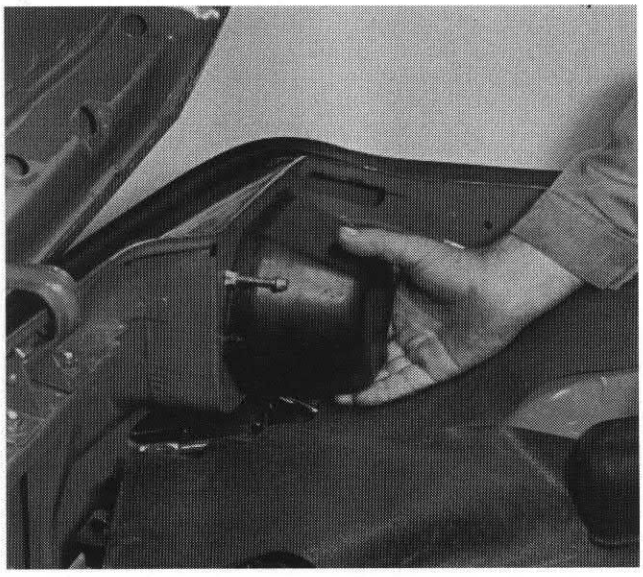
P1V29AM02

- Unscrew the two retaining screws, then remove the squab.



P1V29AM03

- Refit the rear squab and cushion by reversing the removal procedure.

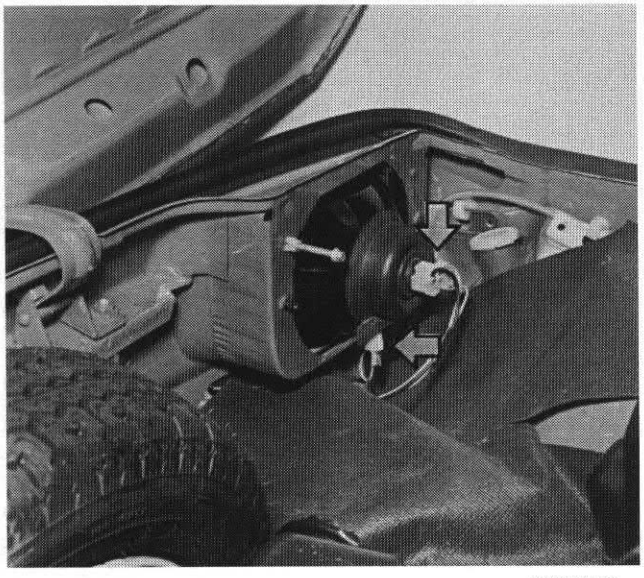


P1V30AM01

FRONT LIGHT CLUSTERS

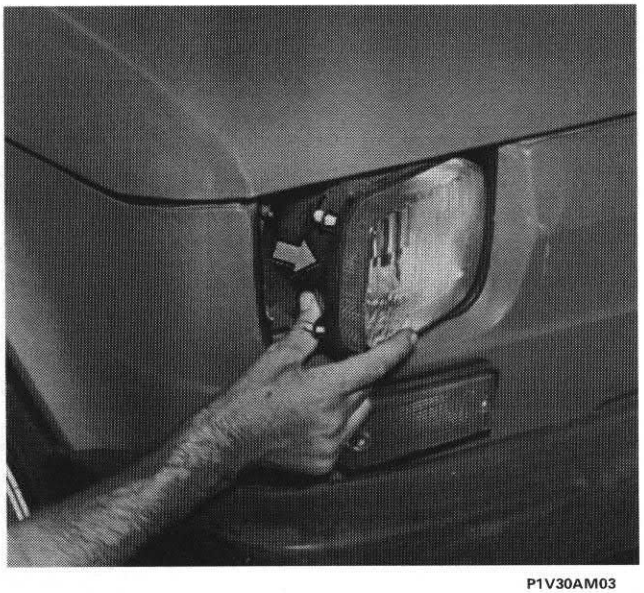
Removing-refitting

- Remove the rear trim.



P1V30AM02

- Disconnect the two connectors shown in the diagram.
- Push from inside the car to remove the light cluster from its housing and release from the retaining pins.
- Refit the light cluster to the car by reversing the removal procedure.



P1V30AM03

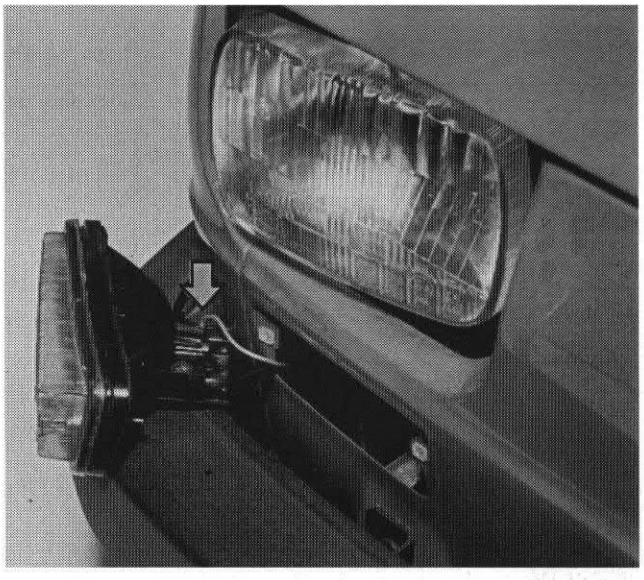
NOTE *Each time a front light cluster is removed and refitted, check headlamp alignment and adjust by means of the adjustment screw (see instructions in car owner handbook).*

FRONT TURN SIGNALS

P1V31AM01

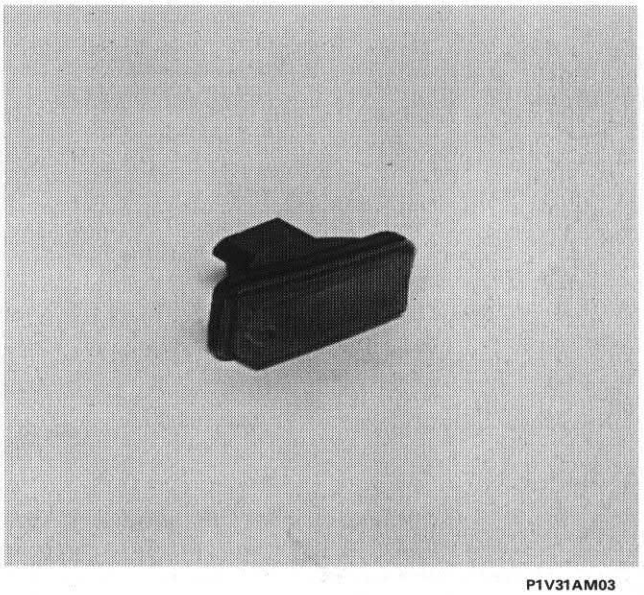
Removing-refitting

- Back off the two retaining screws.



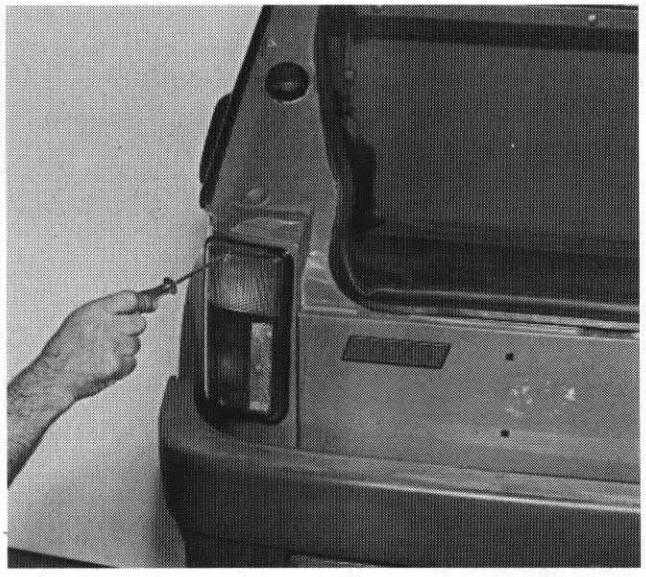
P1V31AM02

- Remove the turn signal from its housing and disconnect the connectors shown.
- Remove the turn signal.



P1V31AM03

- Refit the turn signal by reversing the removal procedure.



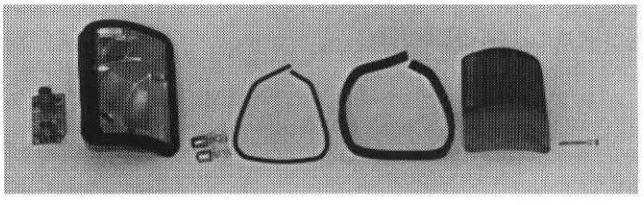
P1V32AM01

TAIL-LIGHT CLUSTERS

Removing-refitting

- Unscrew the retaining screws and remove the lens.

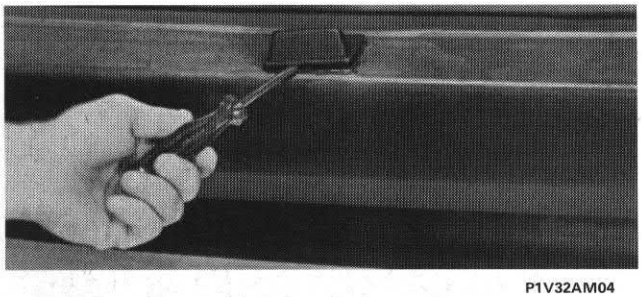
P1V32AM02



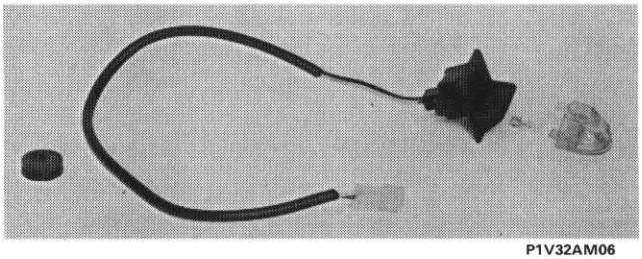
P1V32AM03

- Disconnect the connector and remove the light cluster from the car.
- Refit the light cluster by reversing the removal procedure.

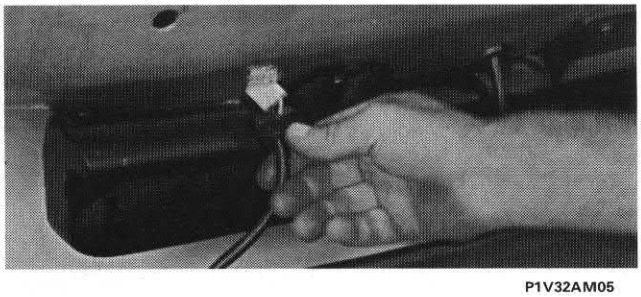
REAR NUMBER PLATE LIGHT



P1V32AM04



P1V32AM06

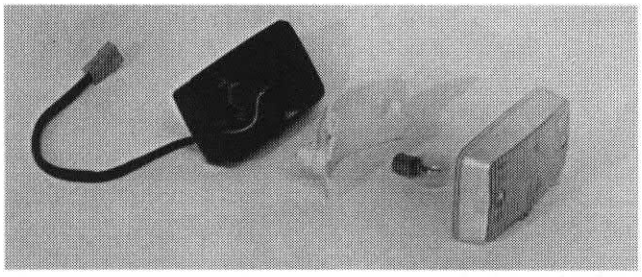


P1V32AM05

Removing-refitting

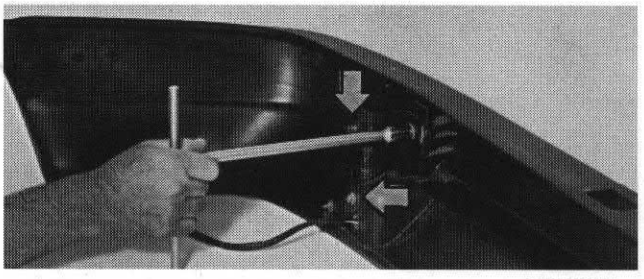
- Prise out the number plate light bulb as indicated in the top box. Disconnect the connector and withdraw the cables.
- Refit the number plate light by reversing the removal procedure.

REVERSING AND REAR FOG LIGHTS

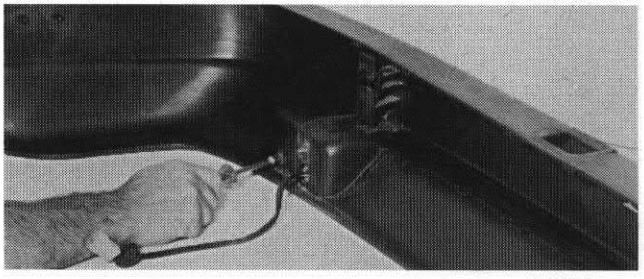


P1V33AM03

- With the rear bumper removed (see page 17), unscrew the four arrowed screws.
- Refit the lights by reversing the removal procedure.



P1V33AM01



P1V33AM02

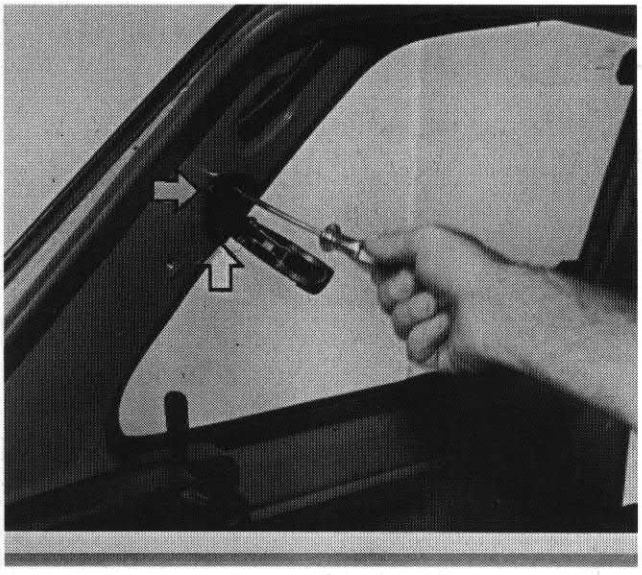
COURTESY LIGHT

P1V33AM04

Removing-refitting

- Remove the courtesy light lens.
- Unscrew the two screws shown in the diagram and disconnect the connector.
- Refit the courtesy light by reversing the removal procedure.

P1V33AM05



P1V34AM01

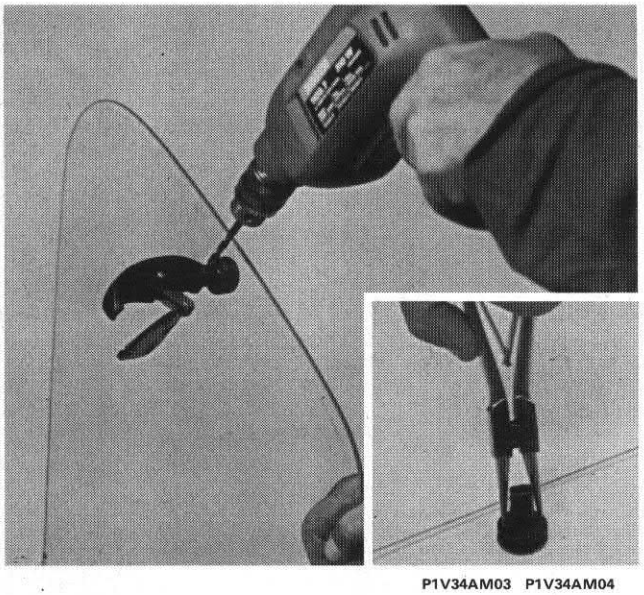
SWIVEL-OPENING SIDE WINDOWS

Removing-refitting

- Unscrew the three fastener block retaining screws.

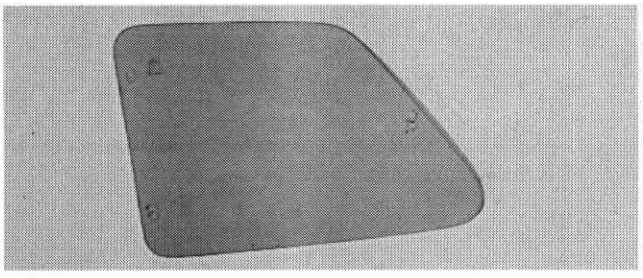
P1V34AM02

- Open the side window until the pins come out of the hinges on the body.

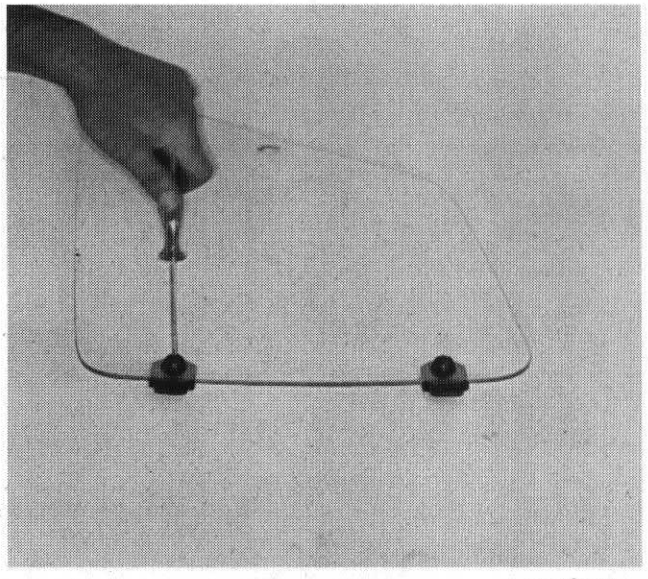


P1V34AM03 P1V34AM04

- Remove the rivets fixing the fastener to the glass, then unscrew the lock collar and withdraw the pin.

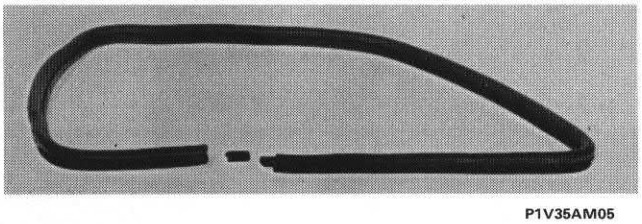


P1V35AM02

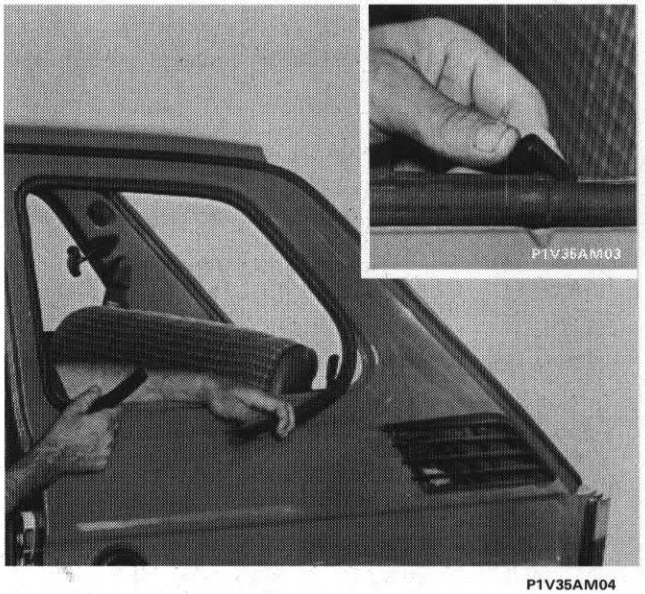


P1V35AM01

- Extract the screw fixing the hinge to the glass and remove.

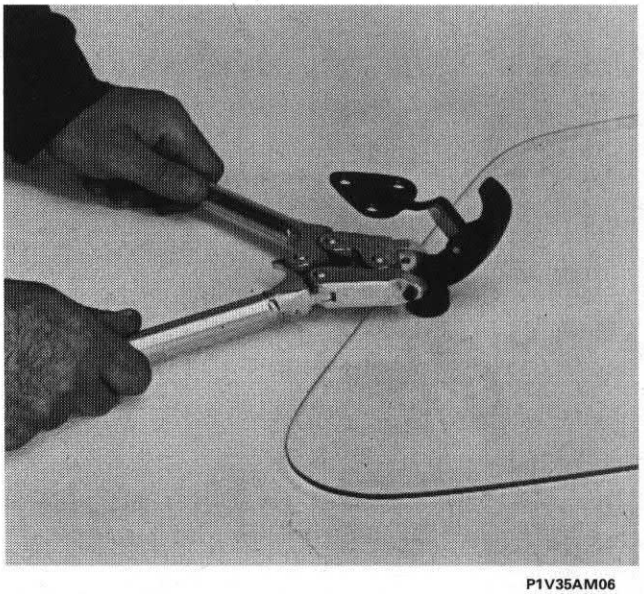


P1V35AM05



P1V35AM04

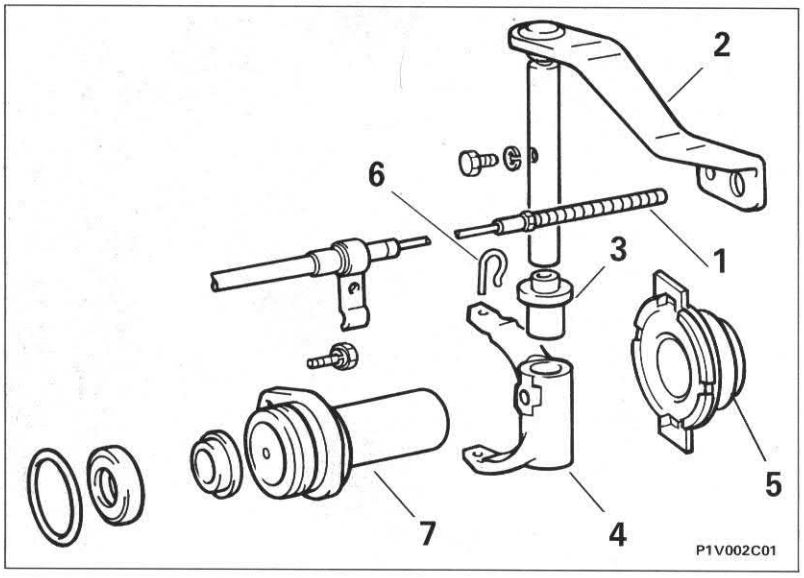
- Detach the weather strip by extracting the peg as shown in the box.
- Remove the frame lining.



P1V35AM06

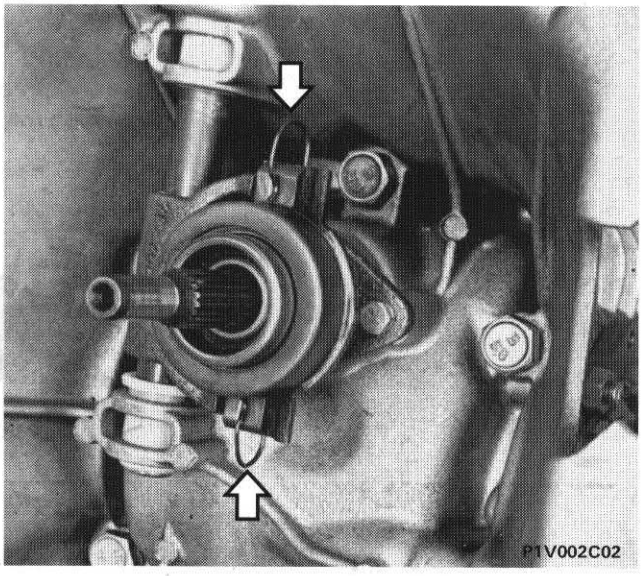
- Refit the fastener by tightening the rivet with a pair of pliers.
- Finish remounting and refit the side window by reversing the procedure.

18.



Components of the release bearing, release fork and fork pivot shaft

1. Clutch cable
2. Clutch release lever complete with fork pivot shaft
3. Bush
4. Clutch release fork
5. Release bearing
6. Release bearing spring clips
7. Release bearing sleeve



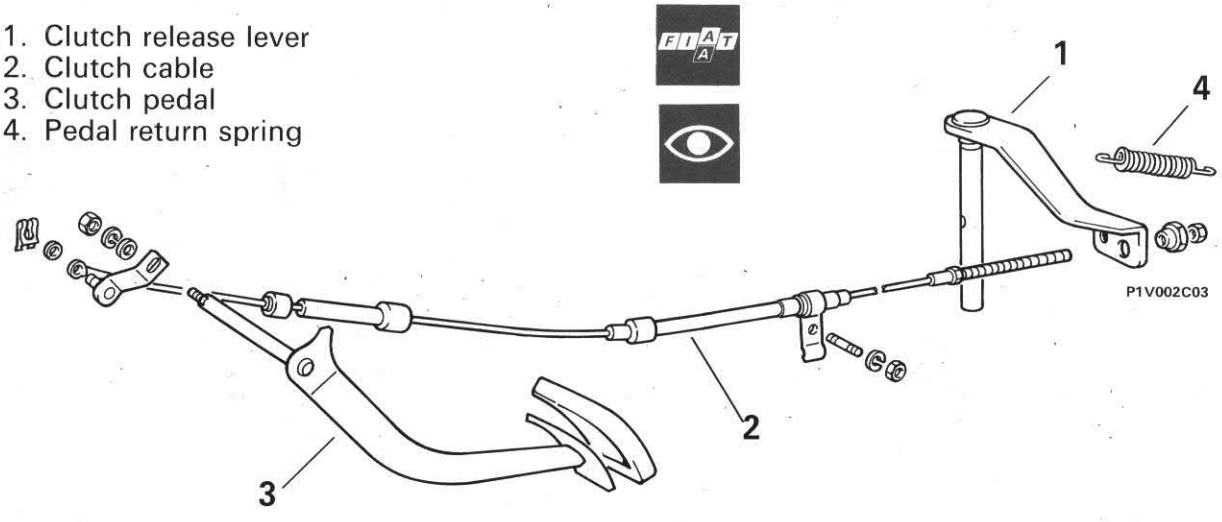
CLUTCH RELEASE BEARING

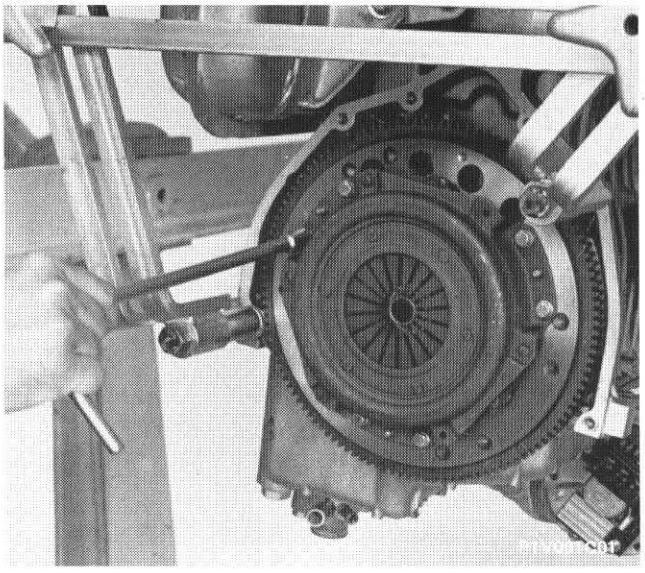
Removing/refitting clutch release bearing clips

The arrows indicate the spring clips

Components of the clutch release mechanism supplied as spares

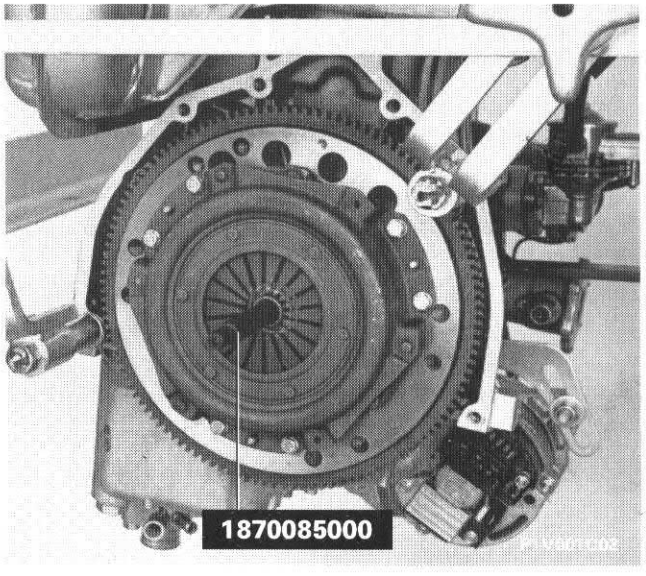
1. Clutch release lever
2. Clutch cable
3. Clutch pedal
4. Pedal return spring





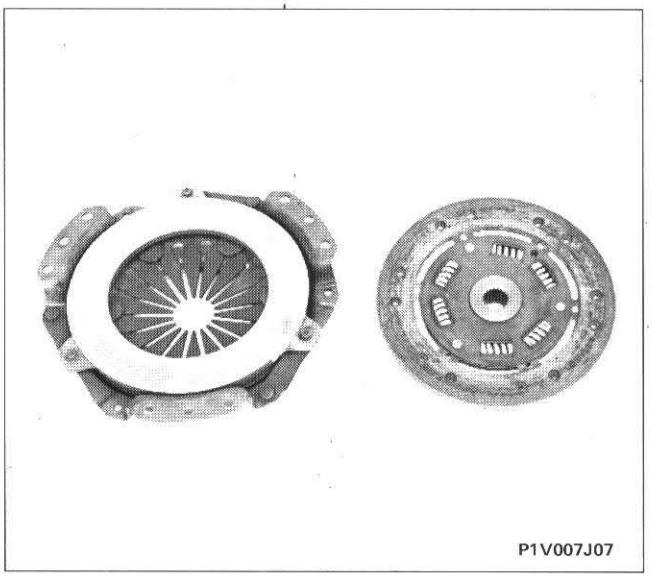
Removing/refitting clutch assembly

NOTE *To remove the clutch, it is necessary to remove the gearbox/differential unit.*
See section 21-27. for removal of the gearbox/differential unit.



Using centring pin 1870085000 to align the driven plate during clutch reassembly.

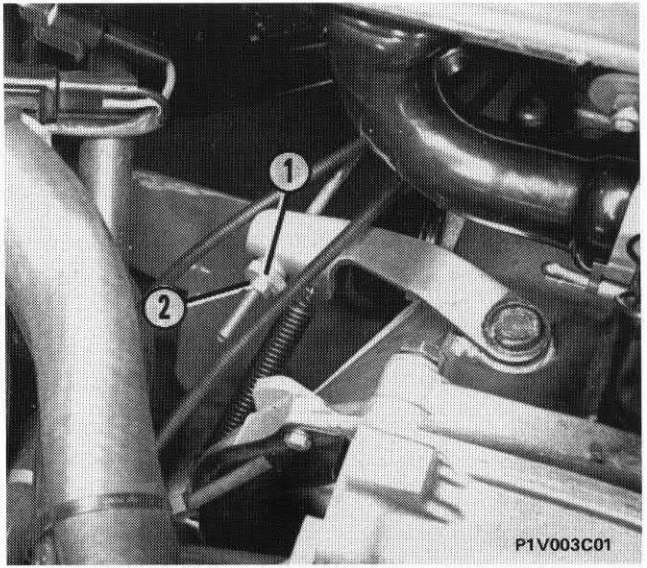
DRIVEN PLATE - CLUTCH COVER



Checking

NOTE *If the friction linings on the driven plate are excessively worn, either they or the complete driven plate should be renewed.*
If the clutch cover shows signs of wear, overheating or deep scoring, the cover assembly should be renewed.

CLUTCH PEDAL



Adjusting clutch pedal position

Adjust the nut (2) and locknut (1) of the cable until the clutch pedal is approximately 20 mm below the level of the brake pedal.

Clutch
Special tools - Torque wrench settings

18.A

1870085000 Driven plate centring pin

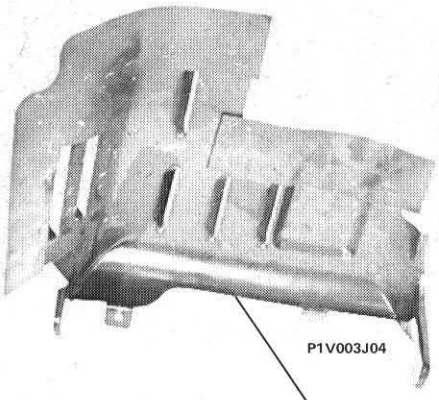
Torque wrench settings

PART	Thread	Torque wrench setting
		daNm
Clutch cover to flywheel bolt	M 6	1
Nut for securing complete lever on clutch release pivot fork	M 8	1.5
Clutch release fork bolt	M 8	2.5
Clutch release sleeve support bolt	M 6	0.83

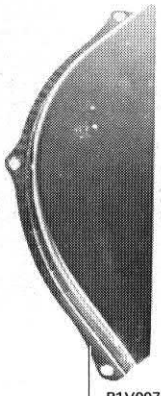
21-27.

Raise the car and disconnect the parts illustrated below:

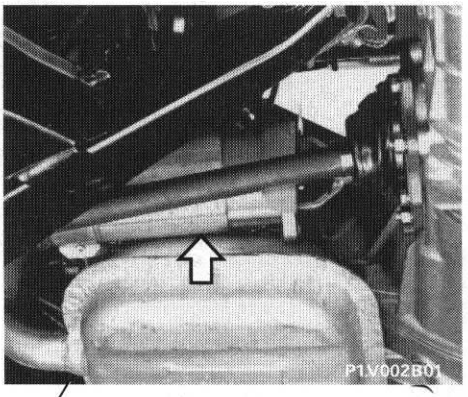
- disconnect the heater duct guard;

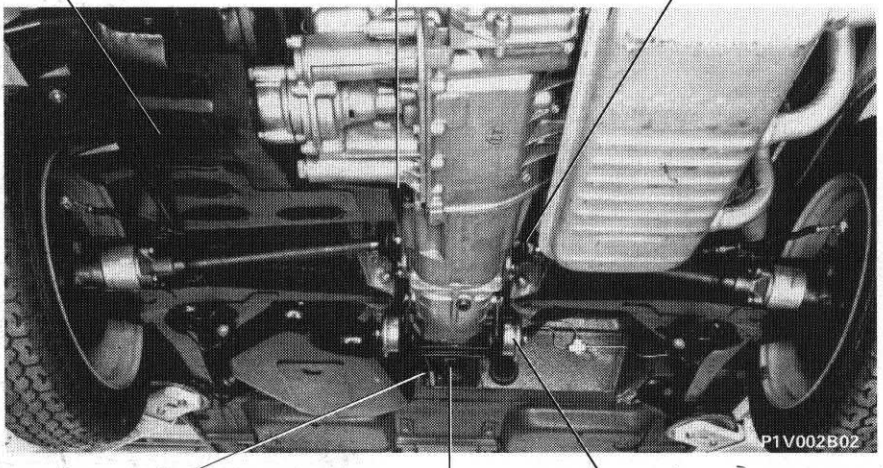

P1V003J04

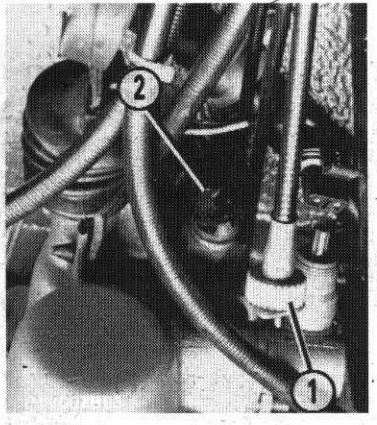
- disconnect the flywheel guard;


P1V007J06

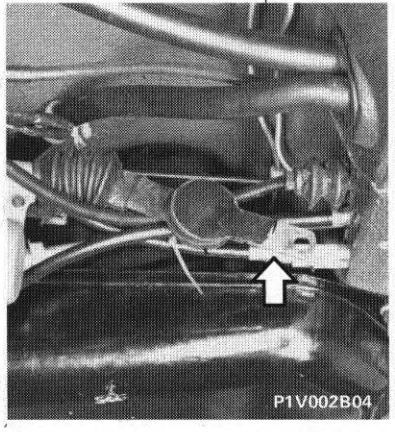
- unscrew the bolts securing the starter motor to the gearbox and rest the starter motor in the engine compartment;


P1V002B01

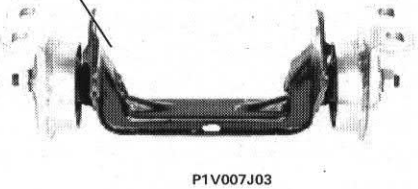

P1V002B02



- disconnect the speedometer cable (1);
- disconnect the reversing light switch wire (2);


P1V002B04

- disconnect the gear control rod from the gearshift lever;


P1V007J03

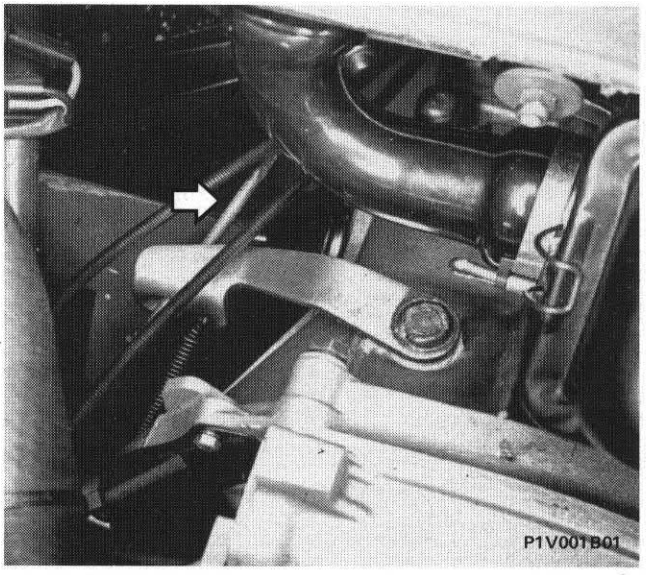
- remove the gearbox support crossmember from the body;

SEQUENCE OF OPERATIONS

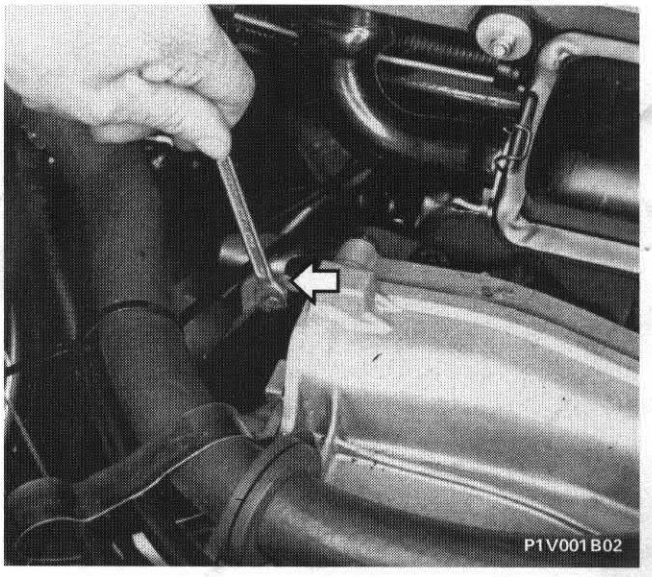
Position the car on ramps.

Proceed as follows:

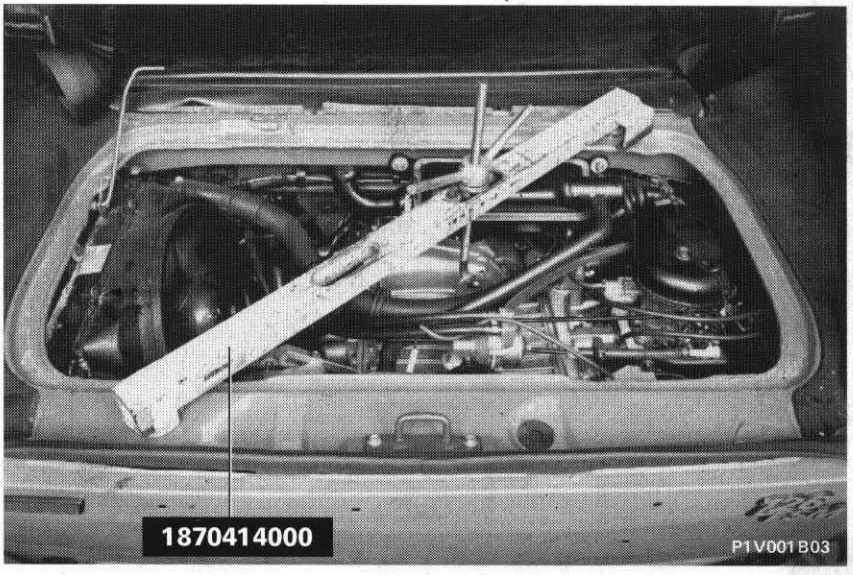
- disconnect the battery earth lead (under the bonnet);
- open the tailgate, remove the interior trim and fold down the rear seat squab;
- disconnect the following:



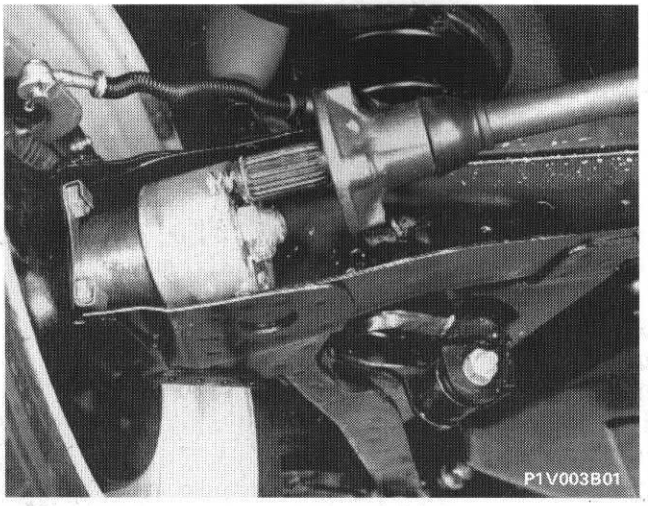
- disconnect the clutch cable (shown by the arrow);

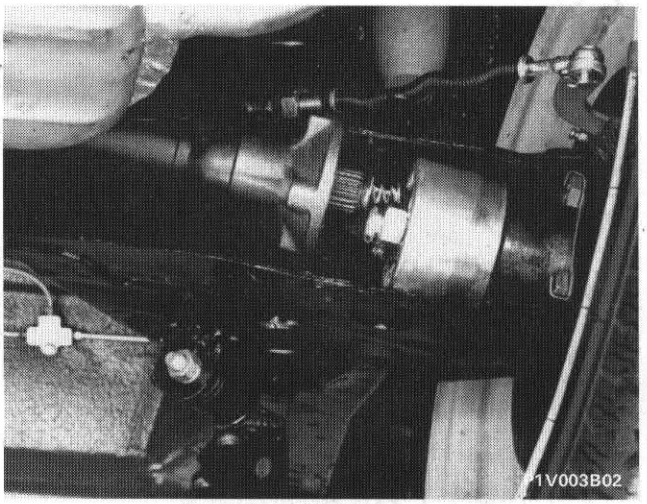


- remove the flywheel guard top bolt;



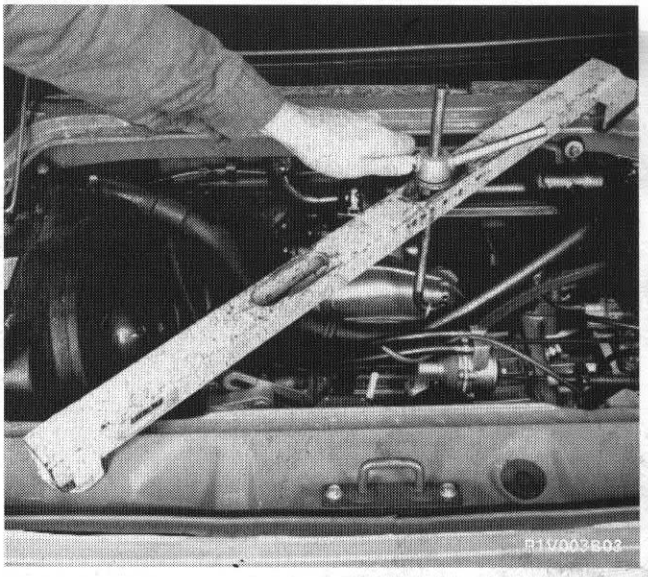
- fit the crossbar 1870414000 and support the engine on the special hook (as shown in photo opposite);





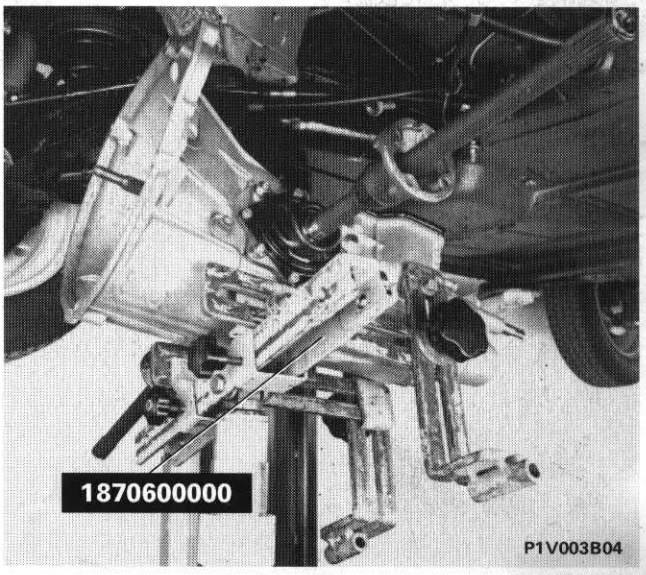
– disconnect the left driveshaft;

– disconnect the right driveshaft;



– lower the engine slightly to facilitate withdrawal of the gearbox;

– unscrew the bolts securing the gearbox-differential unit to the engine;
– manoeuvre the gearbox-differential unit to release it from the locating pins on the engine, and slide the input shaft out of the driven plate;
– lower the hydraulic jack and withdraw the gearbox-differential unit

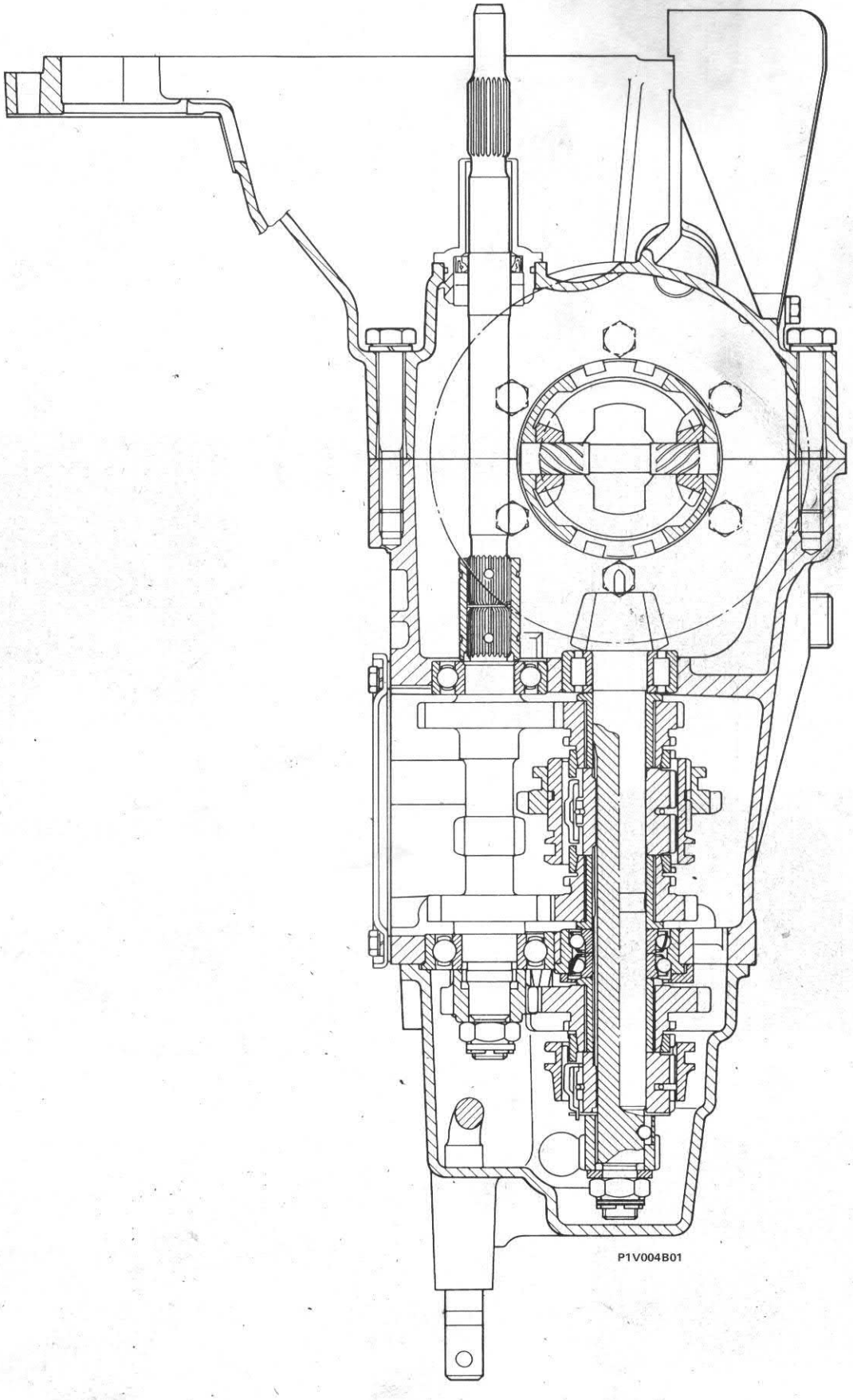


NOTE *To refit the gearbox-differential unit, simply reverse the order of procedure for removal.*

Clutch pedal height.

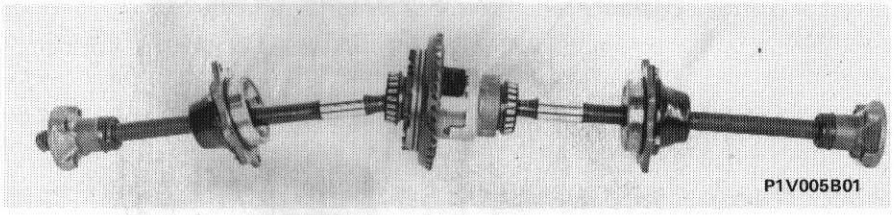
21-27.

LONGITUDINAL SECTION

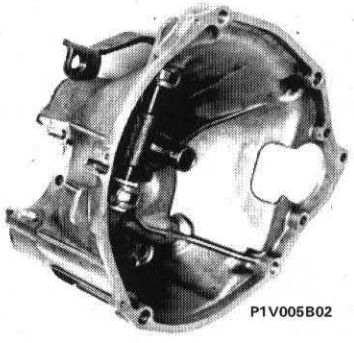


SEQUENCE OF OPERATIONS

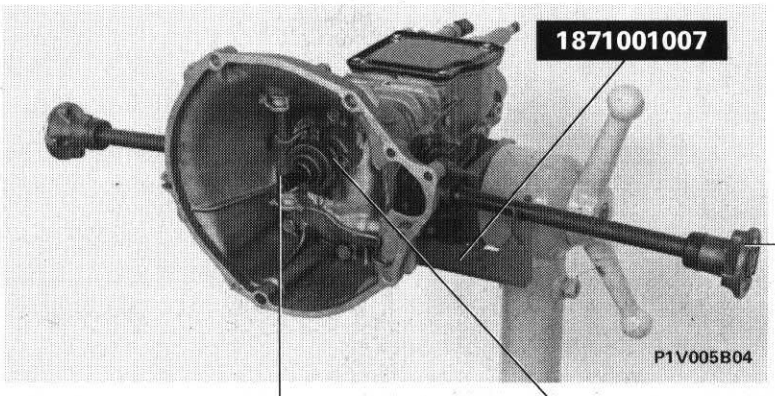
- Drain the gearbox oil;
- place the gearbox on rotating stand 1871000000 using bracket 1871001007;

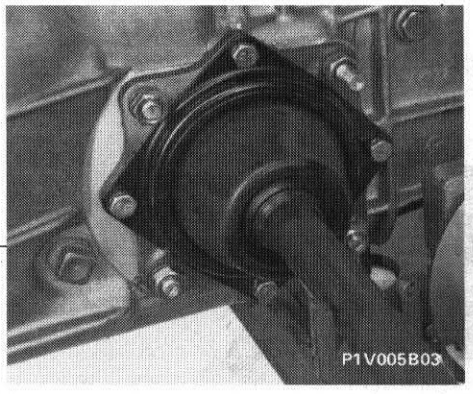


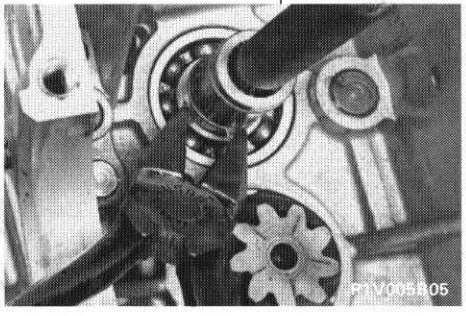
Differential unit complete with driveshafts



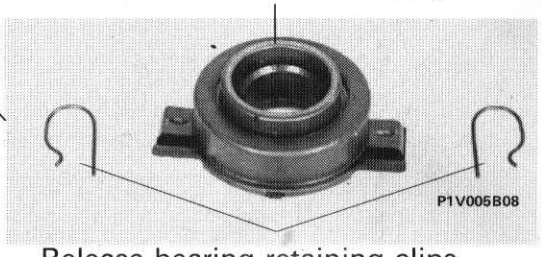
Bellhousing



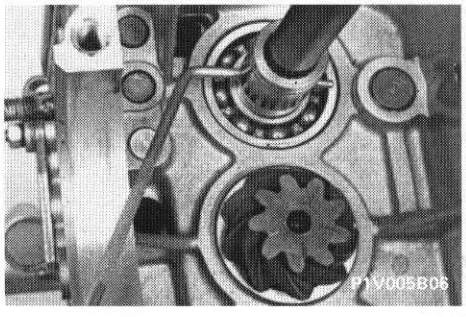




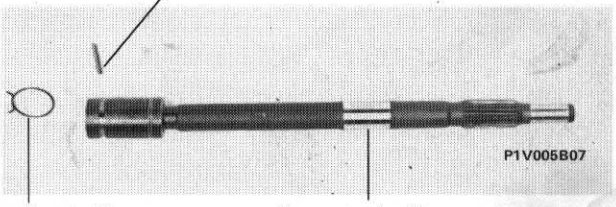
Clutch release bearing



Release bearing retaining clips



Locking pin

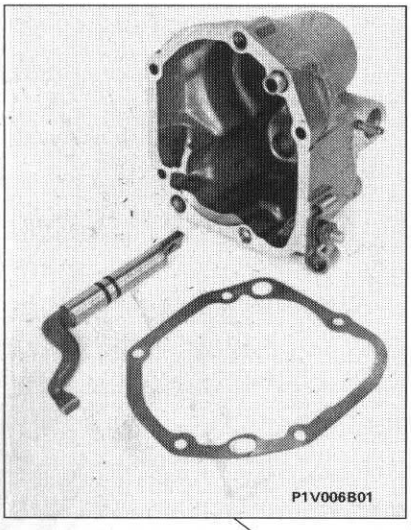


Spring clip

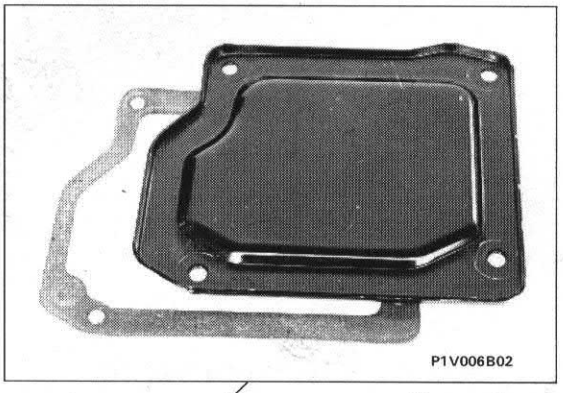
Input shaft

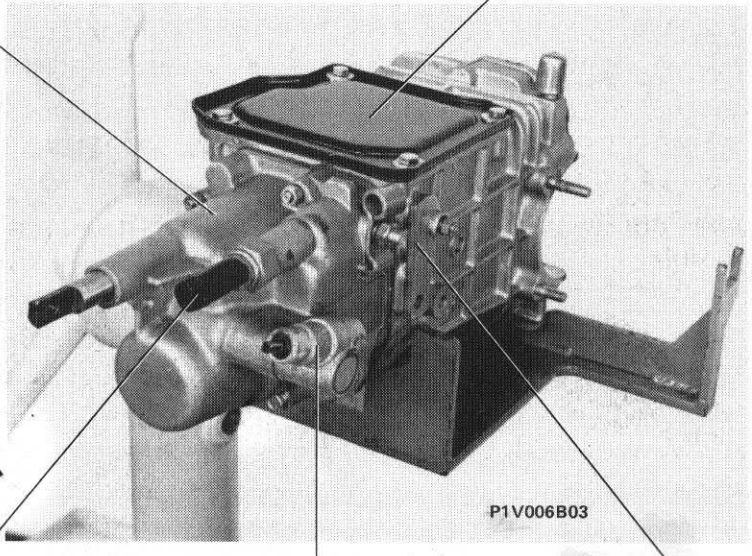
21-27.

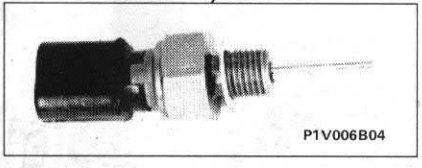
Rear cover



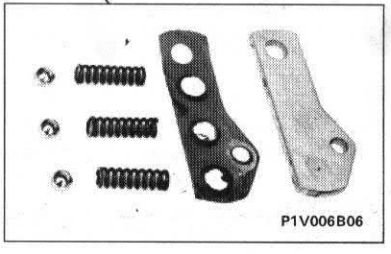
Top cover



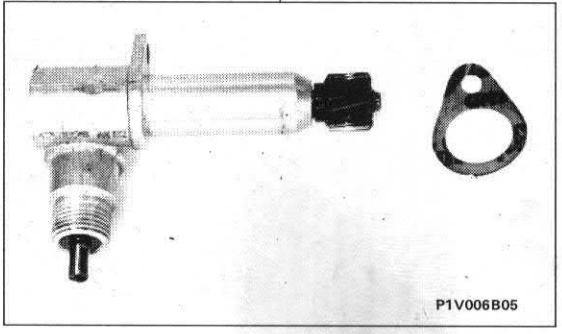




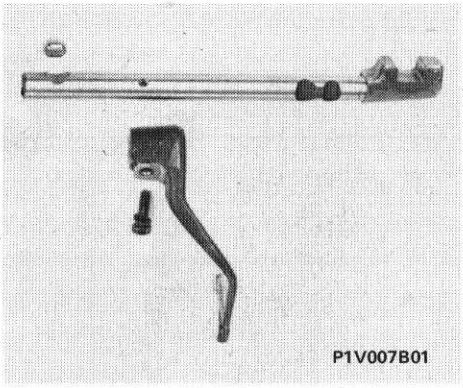
Reversing light switch



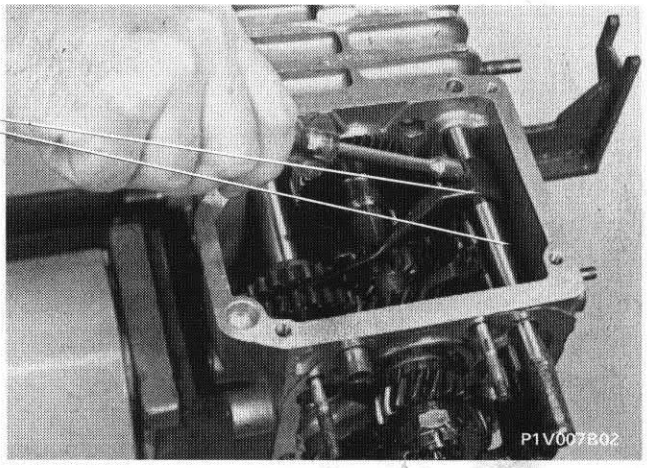
Detent balls and springs cover bolts



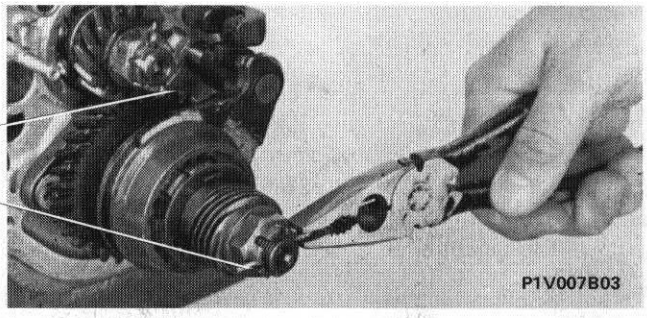
Speedometer drive-gear

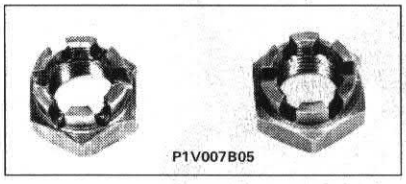


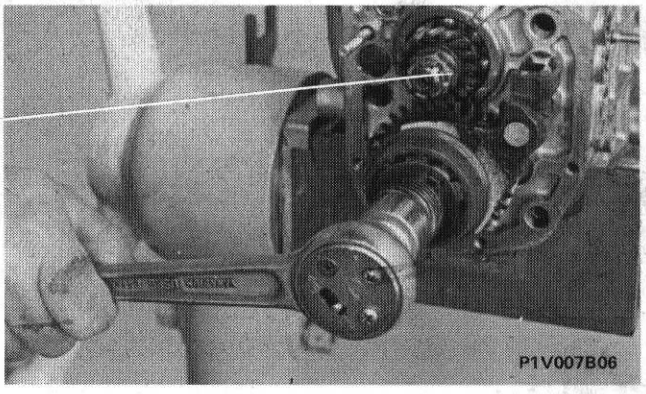
Dismantling reverse gear selector fork and rod



Withdraw the cotter pins from the mainshaft and counter- shaft lock nuts

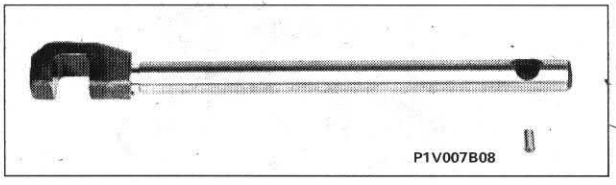


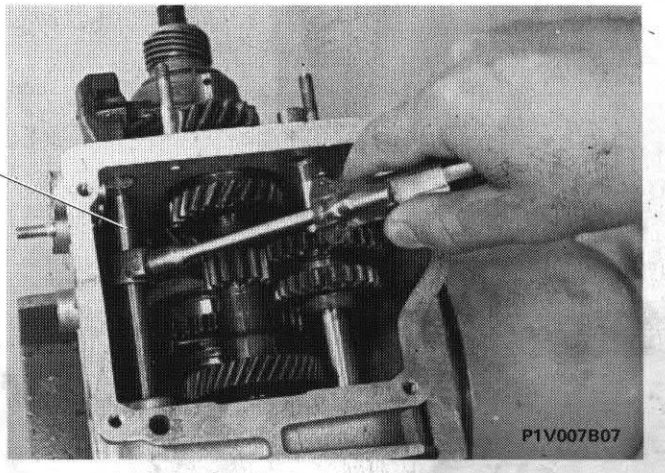




Removing mainshaft and countershaft nuts

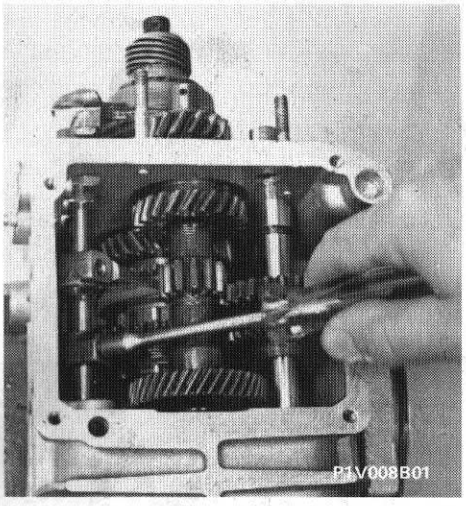
To slacken the mainshaft and countershaft nuts, engage two gears simultaneously to stop the shafts rotating.

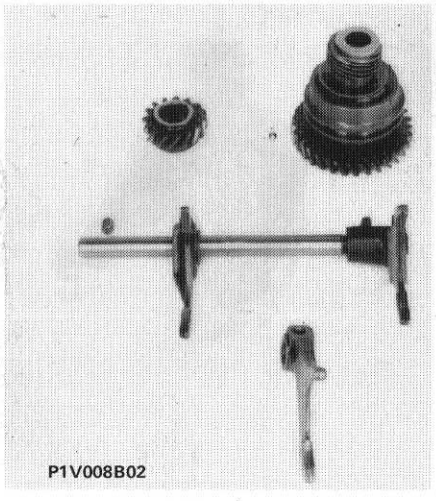




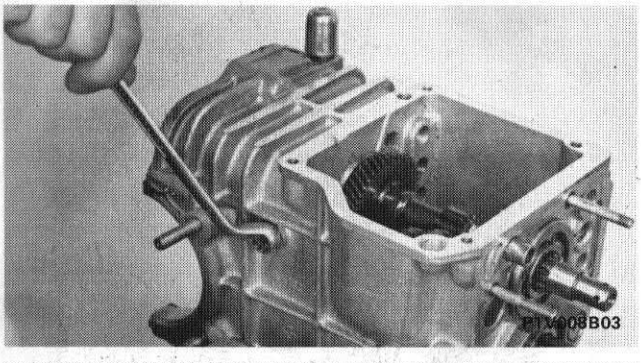
Dismantling 3rd-4th gear selector rod

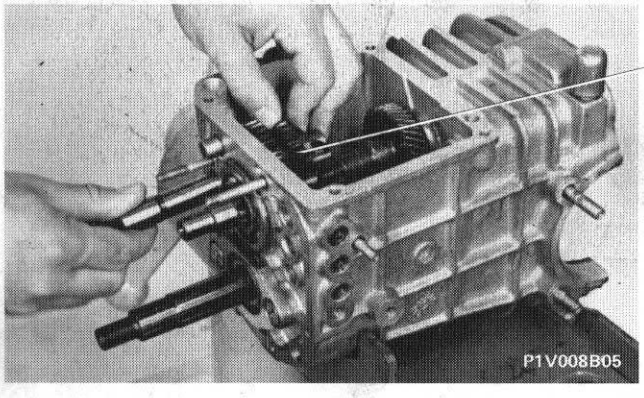
21-27.

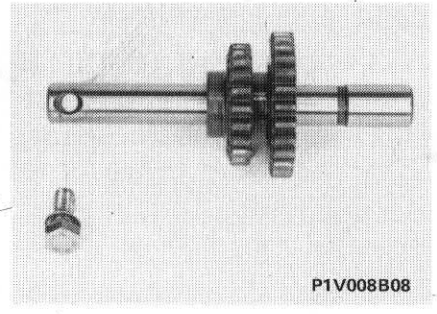




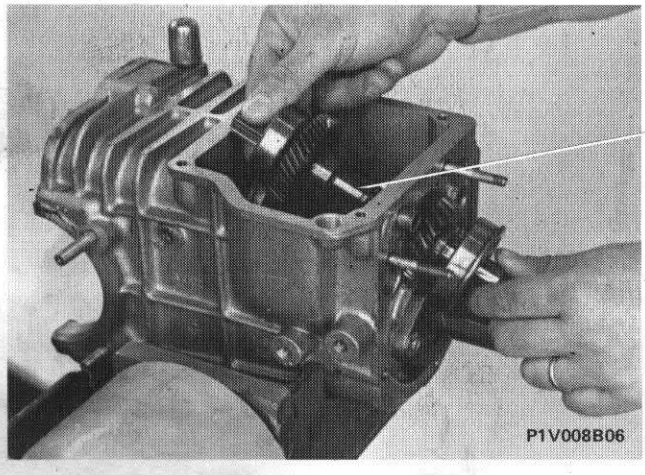
Dismantling 3rd-4th gear selector fork, 1st gear selector fork, 1st-2nd gear selector rod complete with 2nd gear fork, speedometer drivegear, 2nd speed hub, synchro sleeve and gear

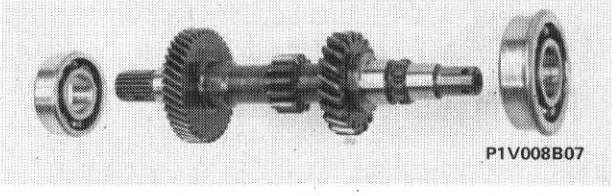




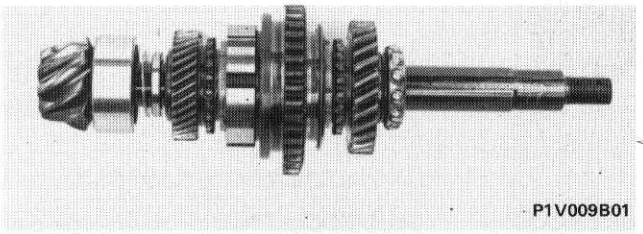


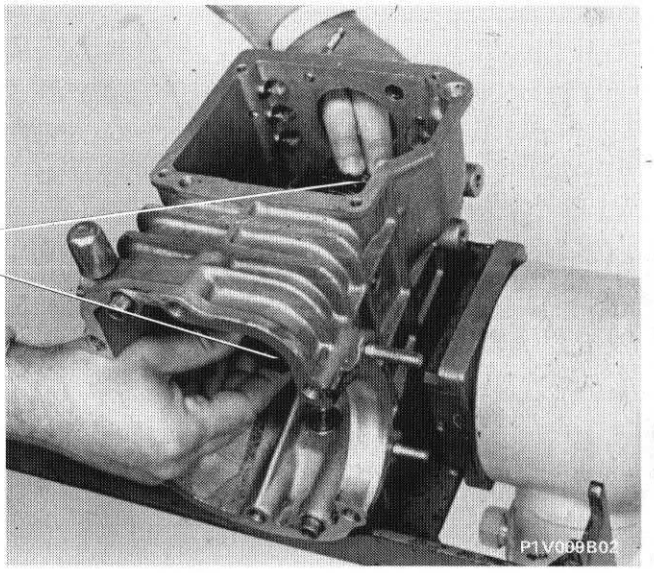
Dismantling reverse idler shaft and gear



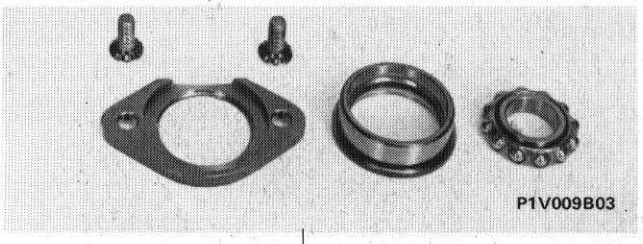


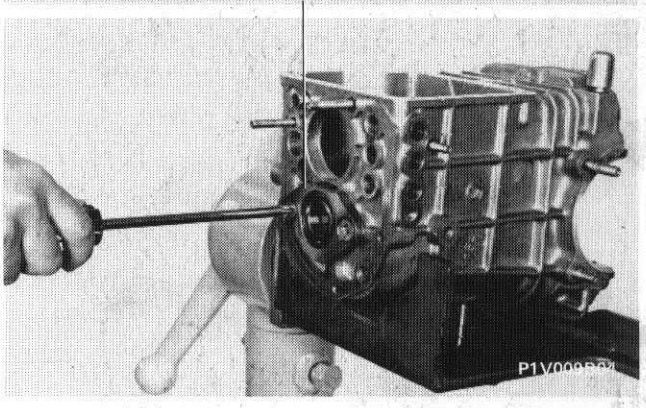
Dismantling mainshaft with front and rear bearings



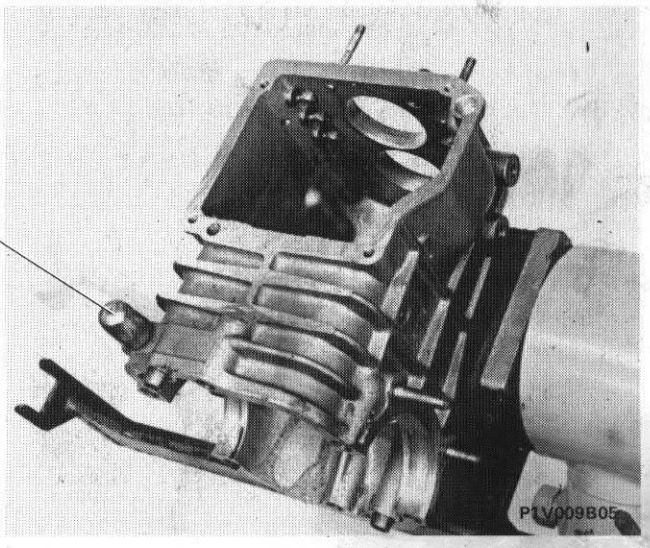


Dismantling countershaft - bevelled pinion and gear train





Dismantling retaining plate and rear bearing

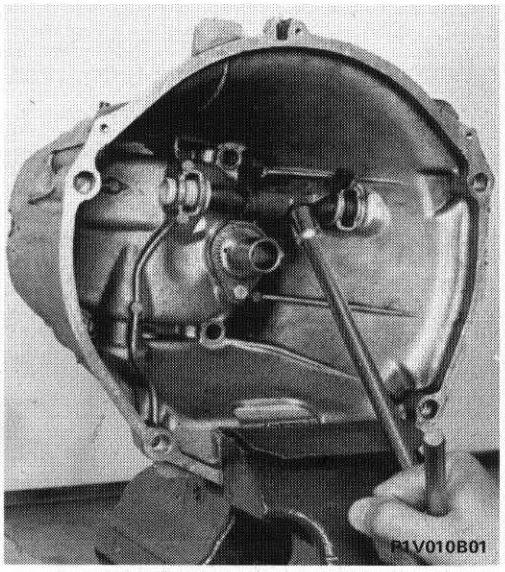


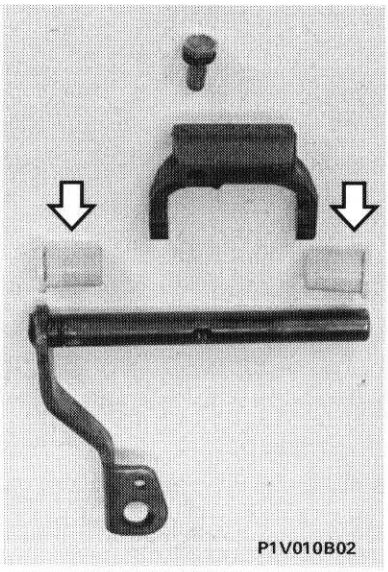
Gearbox casing

The gearbox must not be cracked, and the bearing and rod housings must not be worn or damaged. Contact surfaces must be flat (minor imperfections may be remedied using a fine file).

Ensure that the oil breather is not blocked.

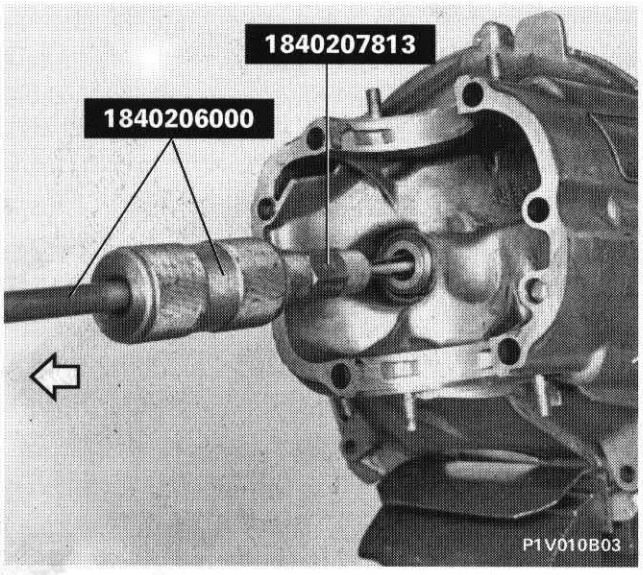
21-27.





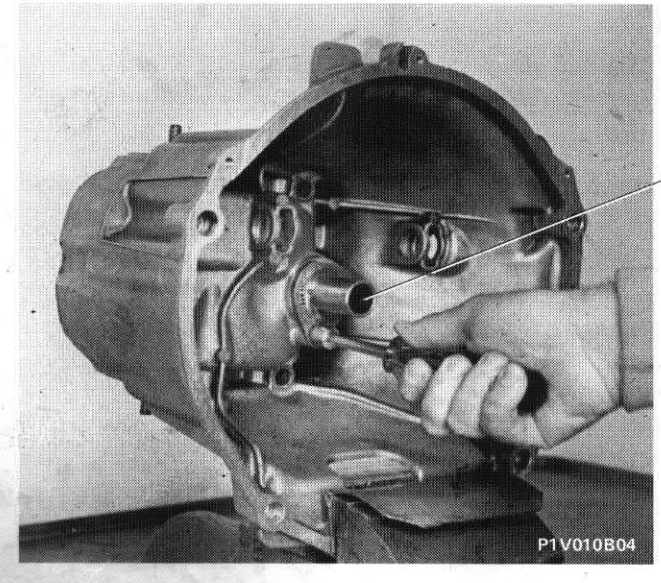
Dismantling/refitting release bearing fork and shaft

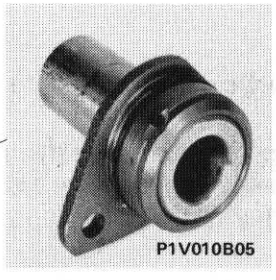
The bushes (indicated by the arrows) should be renewed if there is excessive play in the fork shaft.



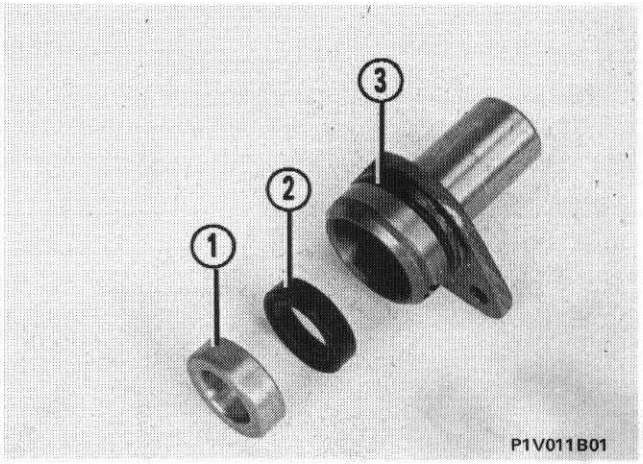
Dismantling bush from release bearing sleeve

NOTE *Use an ordinary drift to fit the bush.*



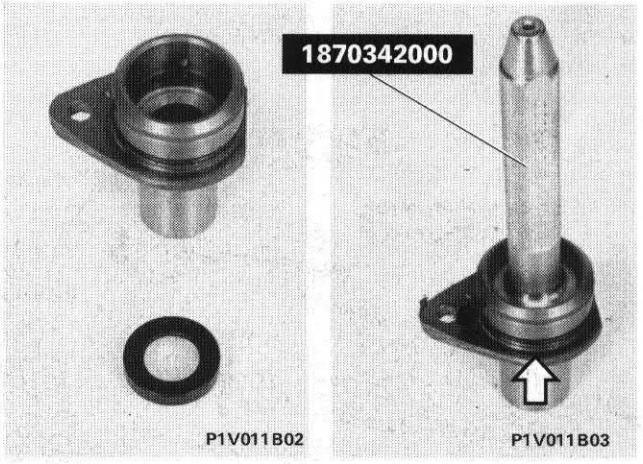


Dismantling release bearing sleeve



Release bearing sleeve

1. Bush
2. Oil seal
3. O-ring seal



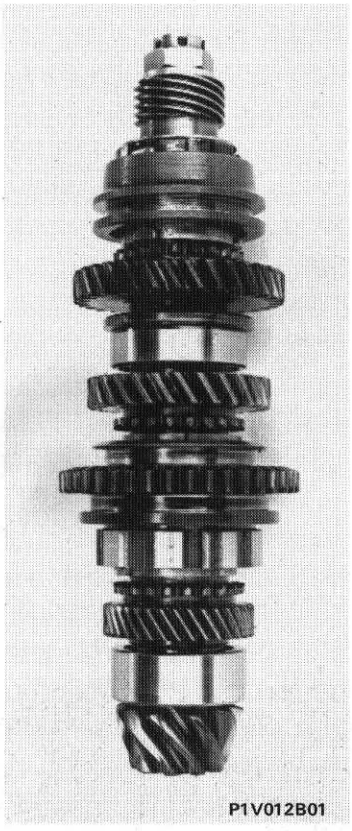
Fitting oil seal onto release bearing sleeve

The oil seal and O-ring must always be replaced new.

NOTE *After the gearbox has been dismantled, the various components must be checked carefully. The following sections contain instructions for the main checks and measurements necessary in order to decide whether a part is suitable for reuse. The correct refitting procedures are also described, and special tools are indicated to facilitate gearbox reassembly.*

Checking bellhousing, gearbox casing and rear cover

The gearbox casing and bellhousing must not be cracked, and the bearing and rod housings must not be worn or damaged. The contact surfaces must be flat (minor imperfections may be remedied using a fine file).



COUNTERSHAFT ASSEMBLY

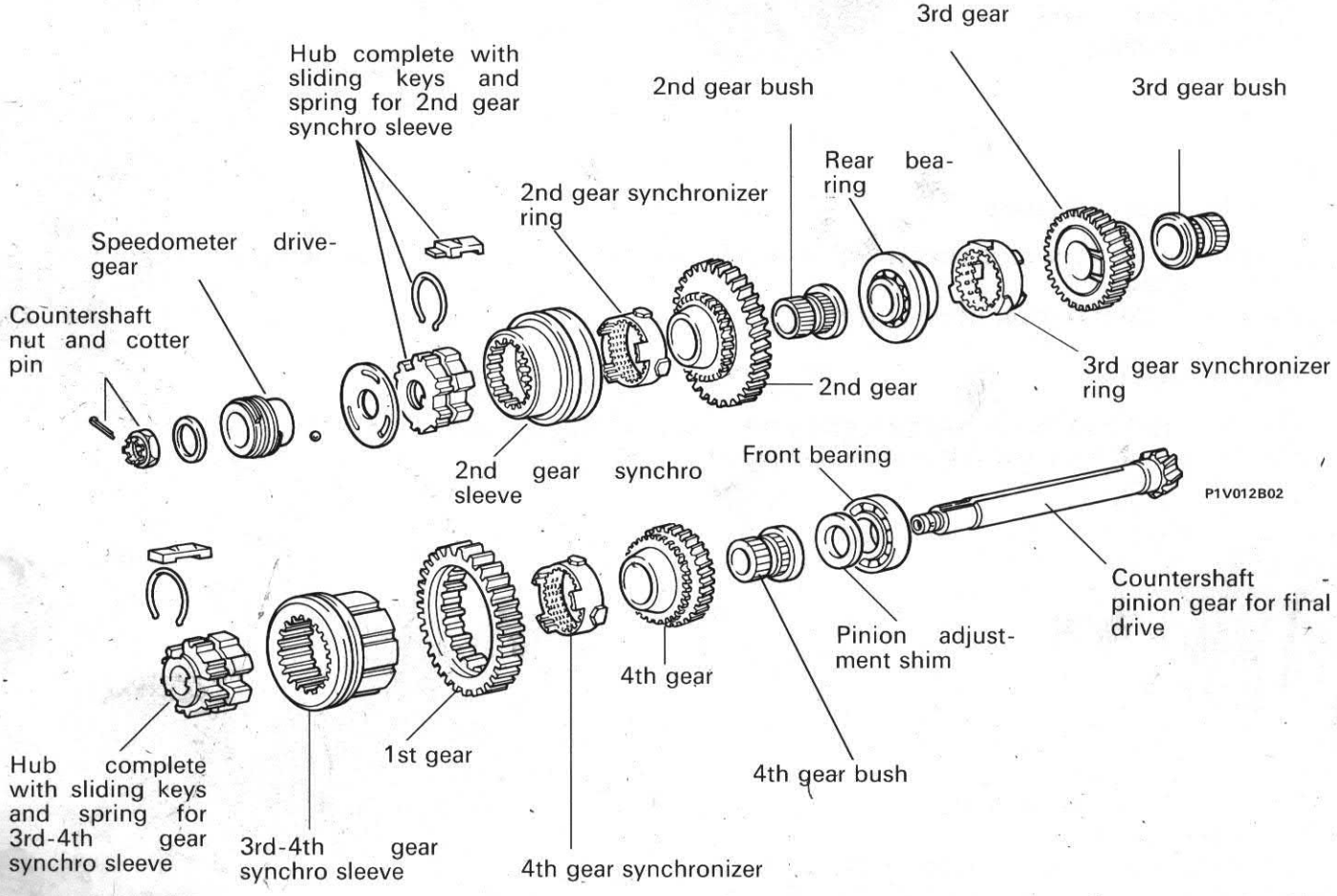
Gears - Bushes

The teeth of gears and synchronizer rings must not be excessively chipped or worn.
Also check that the bush surfaces and gear inner surfaces do not show signs of seizure or abnormal wear (the maximum clearance must not exceed 0.20 mm).

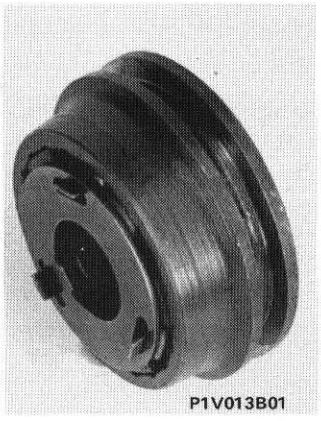
Bearings

The bearings should be renewed if they show signs of scoring, overheating or excess wear.

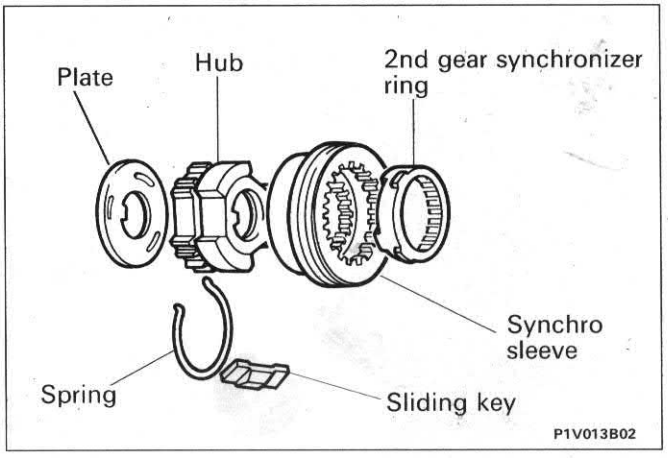
Countershaft - pinion complete with gears, hubs, bearings, synchro rings and sleeves

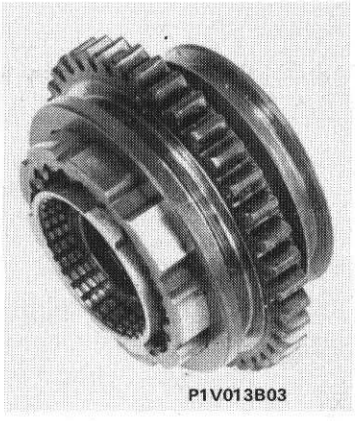


SYNCHRONIZERS



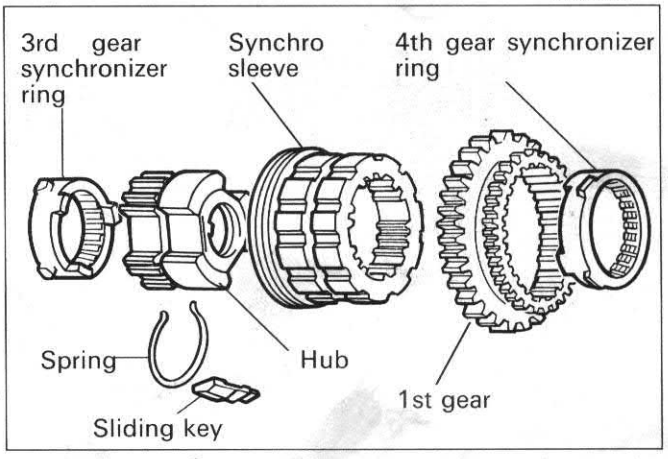
2nd gear hub, synchro ring and sleeve assembly





3rd-4th gear hub, synchronizer and sleeve assembly

P1V013B04



Synchro hubs - Sleeves

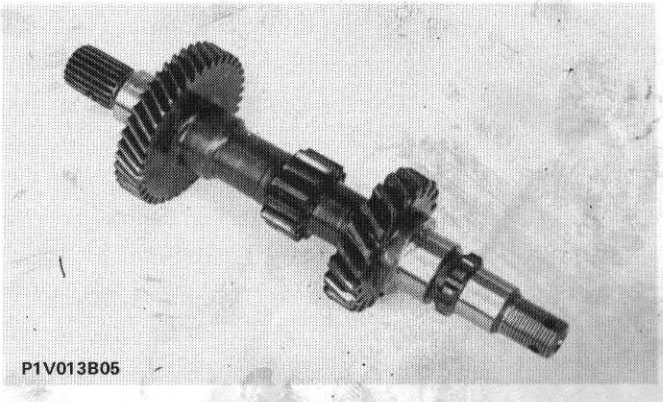
Check that the hubs and sleeves are not chipped and that they slide freely with neither tight spots nor excessive play.
The sleeve splines must not be worn, or replacement will be necessary.

Synchronizers

The inner surfaces of the synchronizer rings must not show signs of wear or out of round.
It is good practice always to renew the synchro rings.

MAINSHAFT

Check that the gear teeth are not chipped or excessively worn.
If the mainshaft needs to be replaced, it is good practice also to replace all the countershaft gears.



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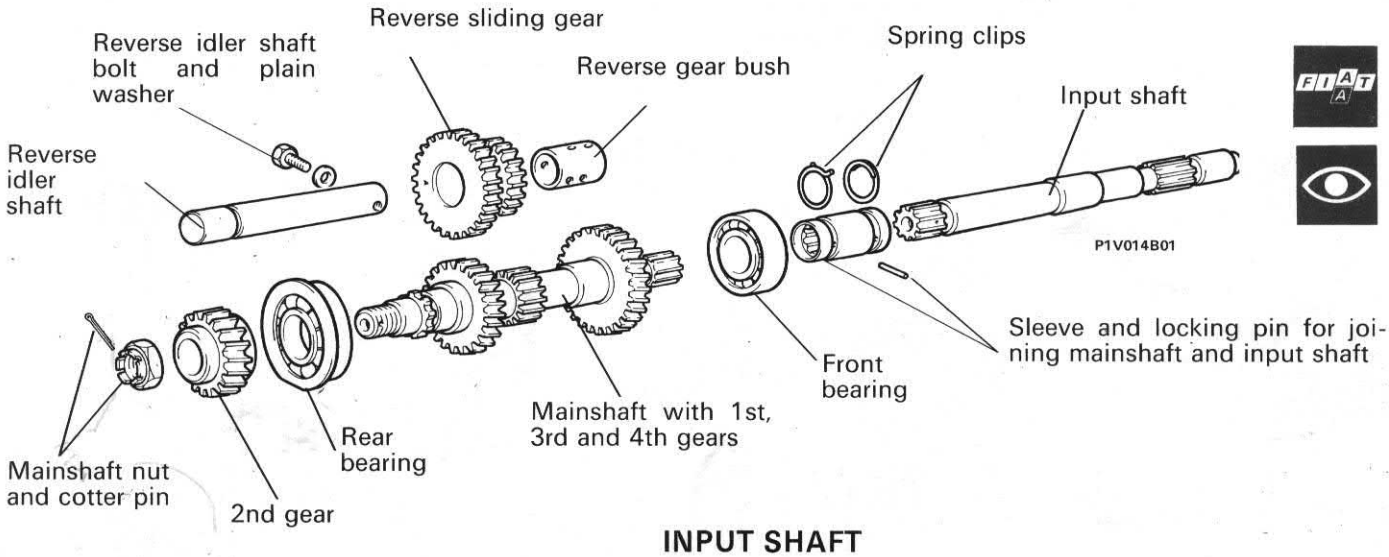
REVERSE IDLER SHAFT AND GEAR

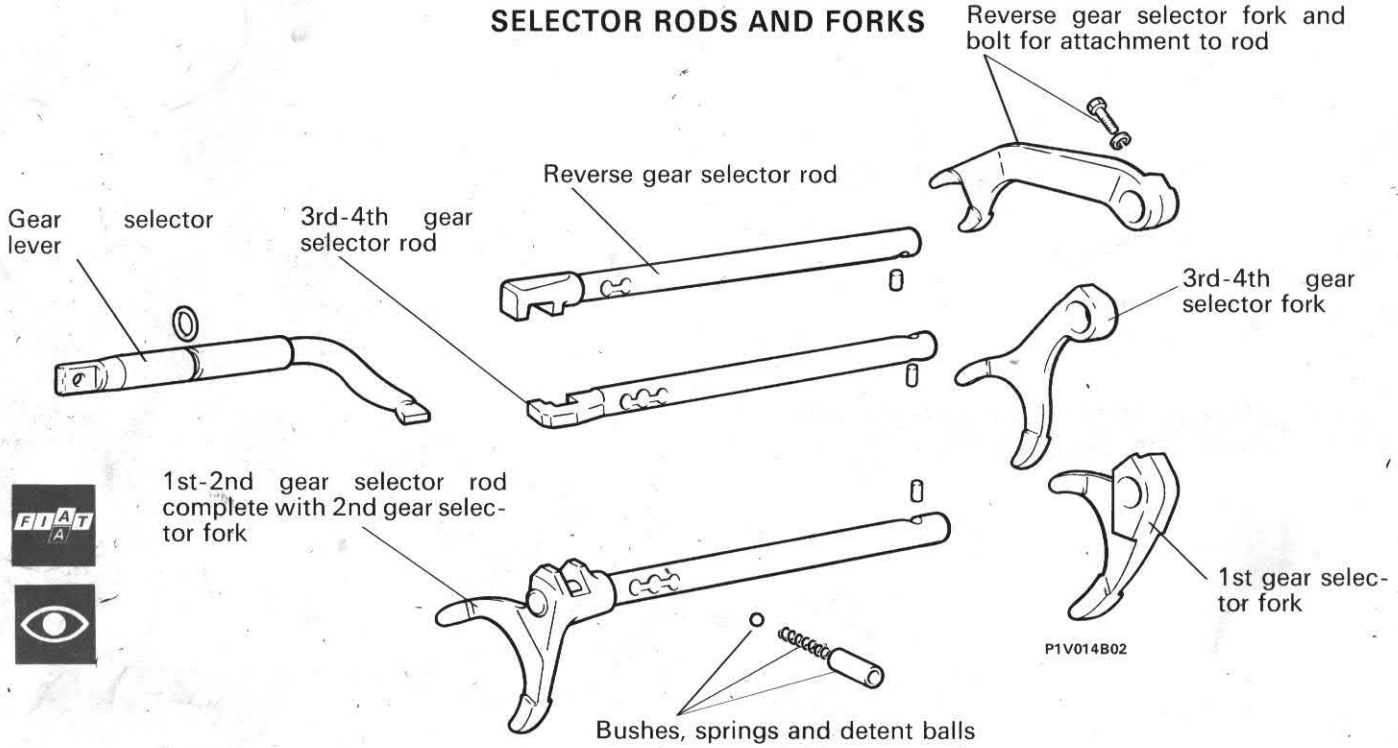
Check that the gear teeth are not excessively chipped or worn. Also check that the shaft and inner bush do not show signs of seizure or abnormal wear.



INPUT SHAFT

Check that the sleeve and shaft splines are not worn or damaged.

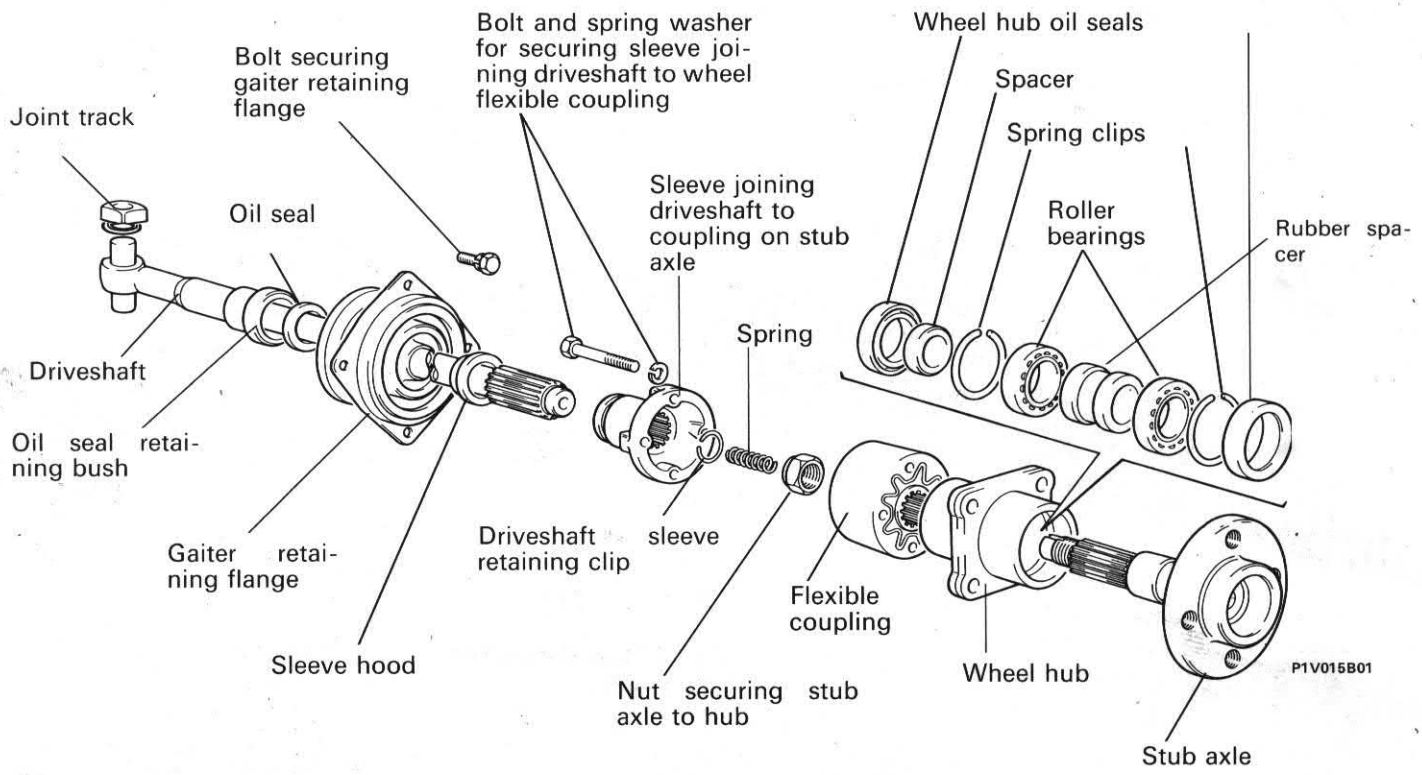
SELECTOR RODS AND FORKS



Checking selector rods and forks

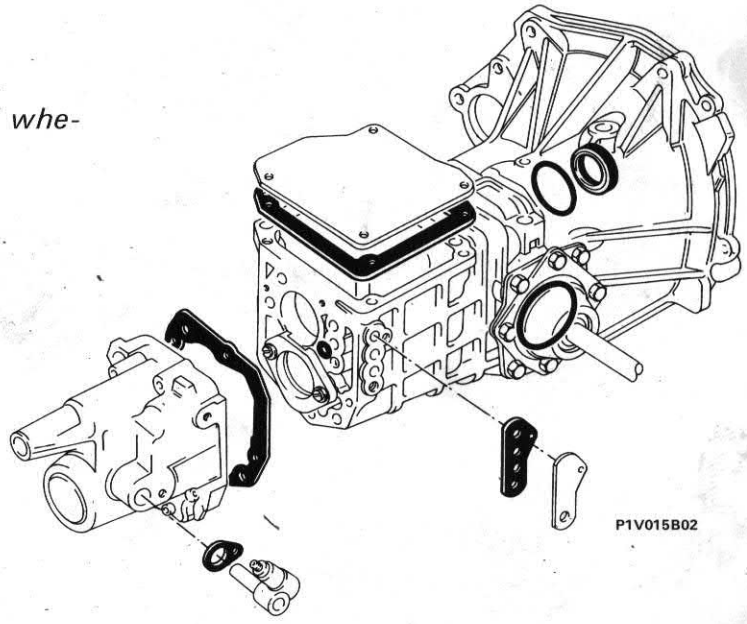
The forks must not show signs of distortion or wear on the surfaces in contact with the synchro sleeves. The rods must not show signs of distortion or wear on the detent ball housings. They should slide freely in their housings without excessive play.

DRIVESHAFT, STUB AXLE AND REAR WHEEL HUB ASSEMBLIES

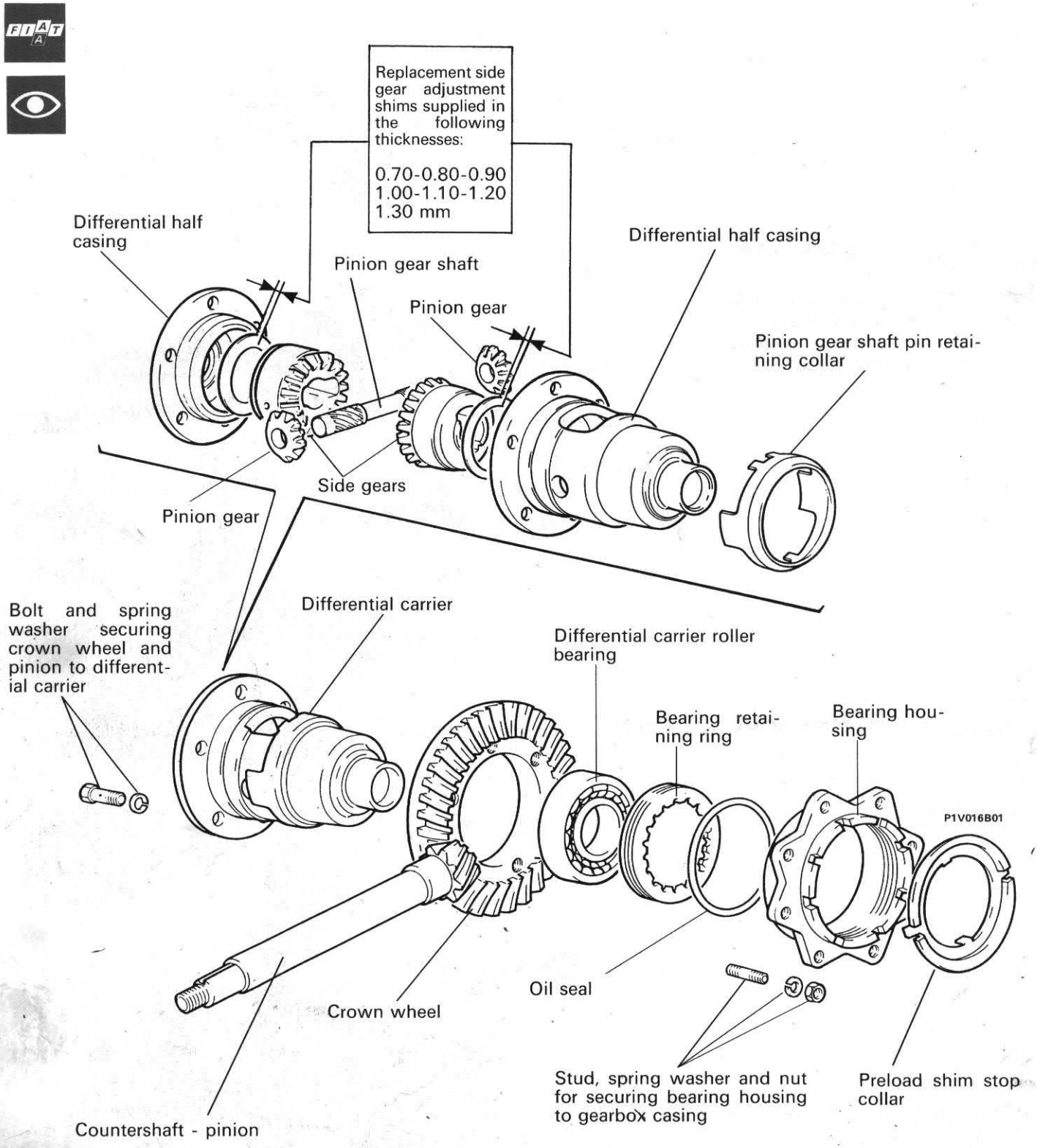


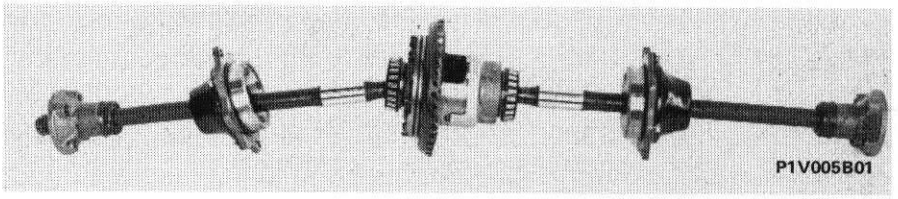
Gasket set for gearbox/differential overhaul

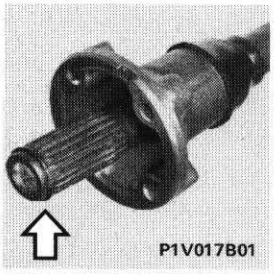
The gaskets must be replaced whenever parts are dismantled



DIFFERENTIAL ASSEMBLY

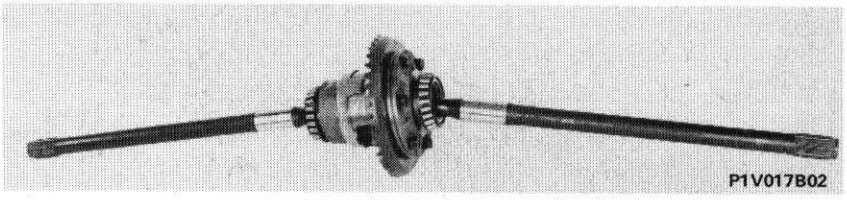


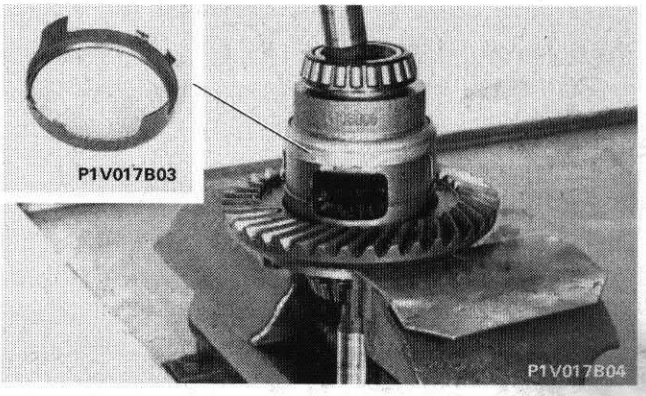




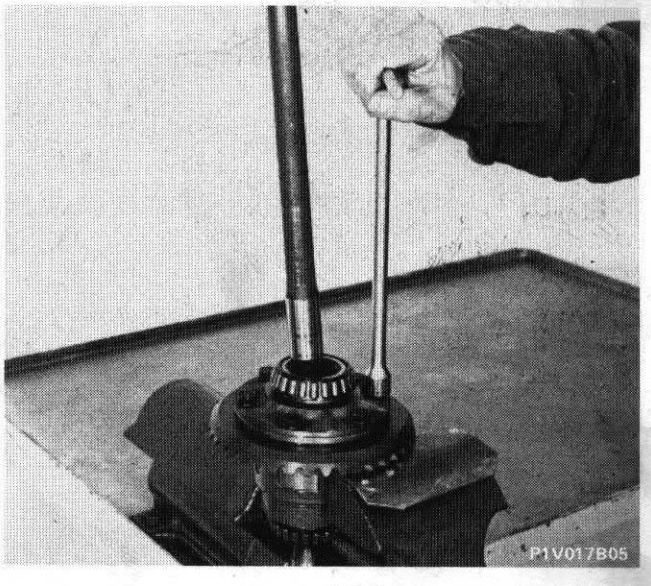
Differential complete with driveshafts

To dismantle the sleeve joining the drive shaft to the stub axle coupling, remove the spring clip (indicated by the arrow).





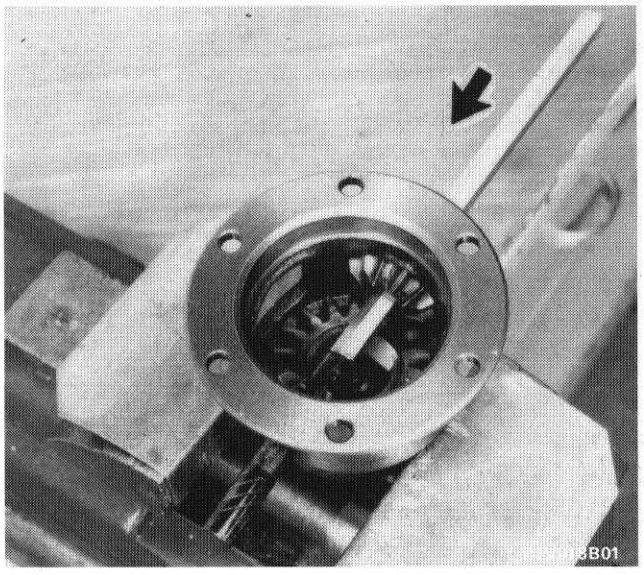
Dismantling pinion gear shaft retaining collar

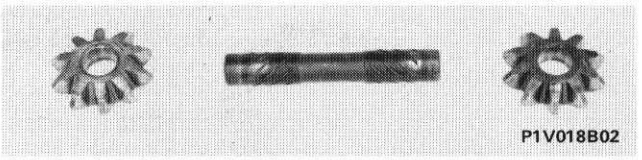


Dismantling crown wheel from differential casing

If the crown wheel needs to be replaced, it is good practice also to renew the pinion.

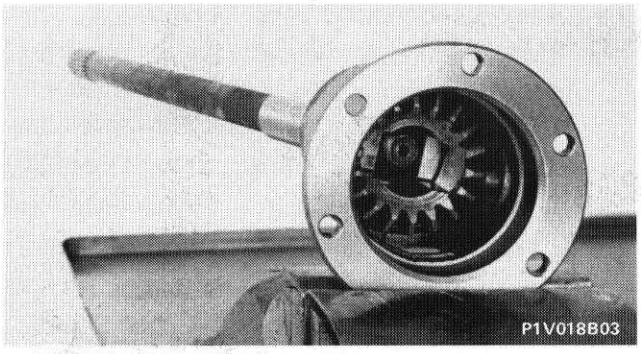
21-27.

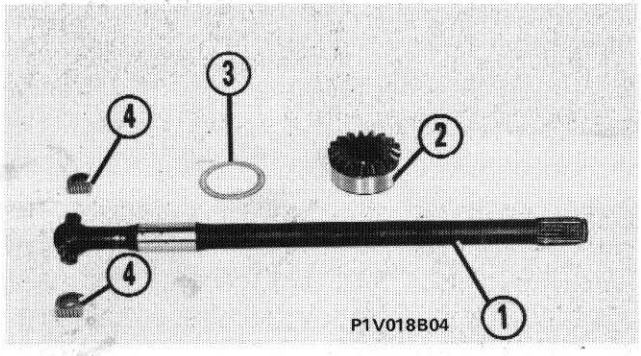




Dismantling and disassembling differential half casings and pinion gear shaft

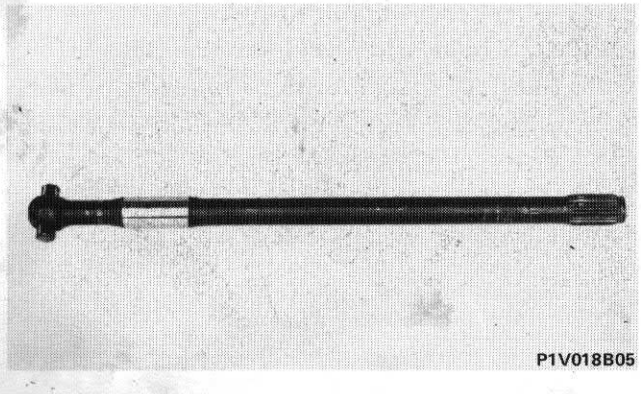
The pinion gear shaft must not show signs of seizure, wear or excessive play between it and the carrier. The working surfaces of the differential pinion and side gears must not be chipped or worn.





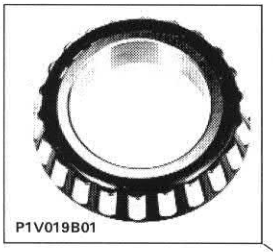
Dismantling side gear half shaft, adjustment shim and bipod joint

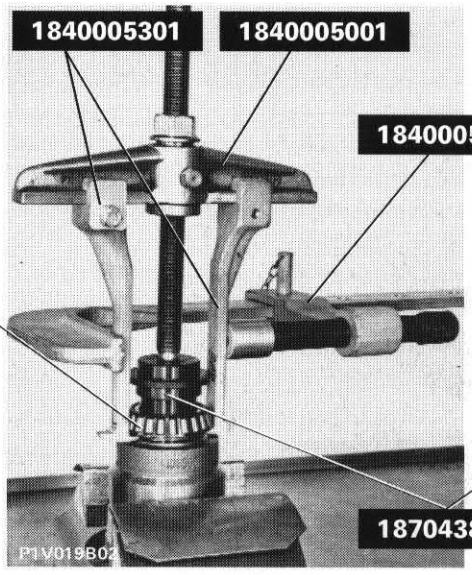
1. Driveshaft
2. Side gear
3. Adjustment shim
4. Joint pad



Checking driveshaft

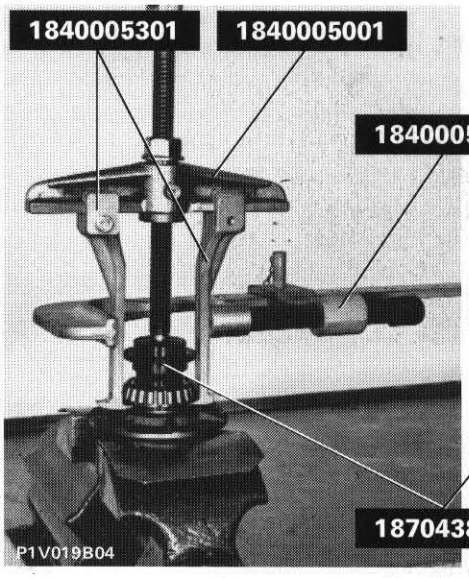
Check that the driveshaft is not distorted or out of true, and that the surface in contact with the oil seal is not worn.If the bipod joint is defective, replace the driveshaft.

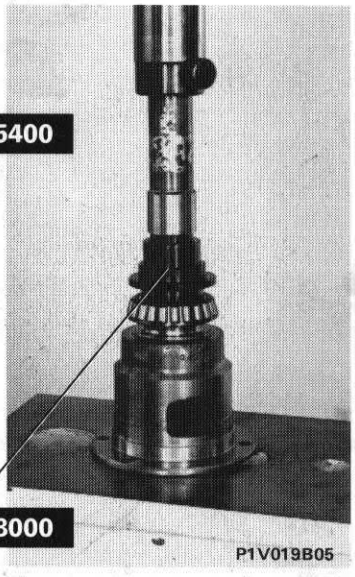




Removing and refitting differential carrier roller bearings

The bearings should be replaced if they show signs of scoring, overheating or excessive wear.

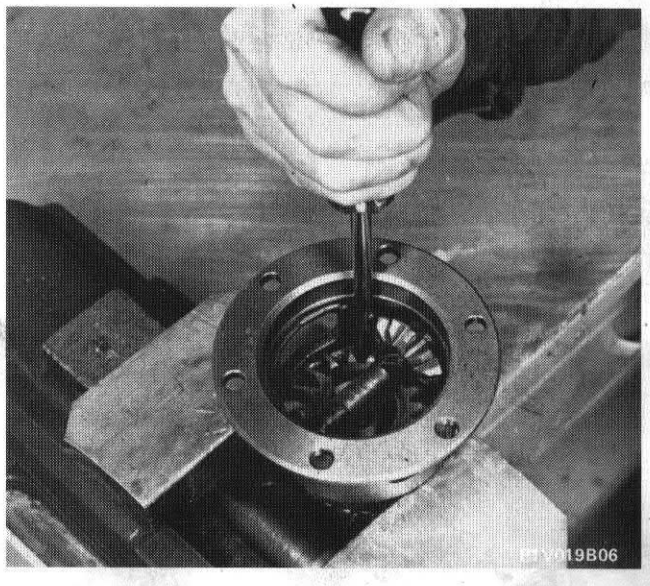




Assembly of side and pinion gears and clearance adjustment

Replacement side gear adjustment shims are supplied in the following thicknesses: 0.70 - 0.80 - 0.90 - 1.00 -1.10 - 1.20 -1.30 mm

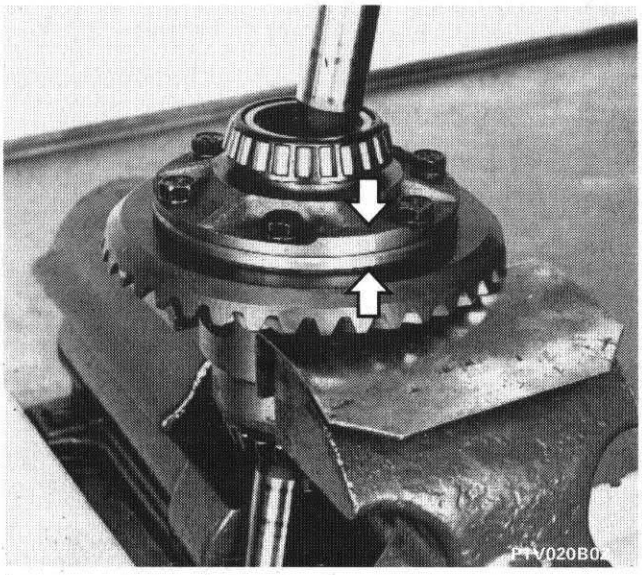
NOTE *Use the appropriate adjustment shim to obtain the correct clearance between side and pinion gear.*
The clearance is correct when the assembly rotates without play and with slight resistance.



21-27.

Fitting side gear adjustment shim

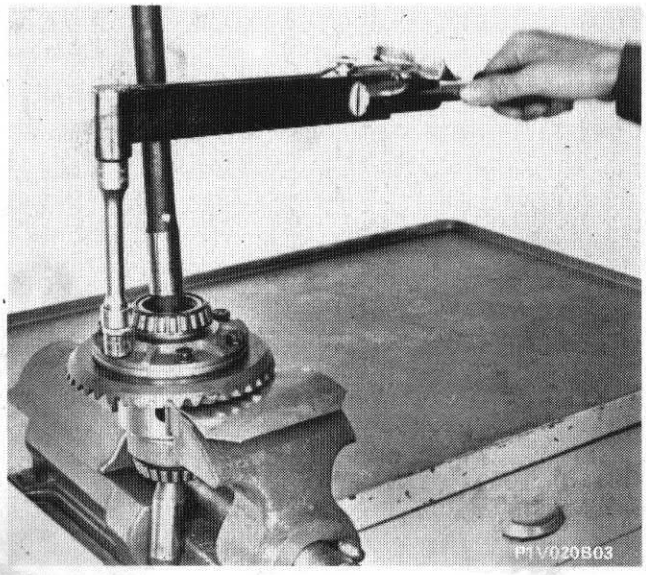
NOTA *Adjustment shims of the same thickness must be assembled on the side gears.*



Fitting differential half casings

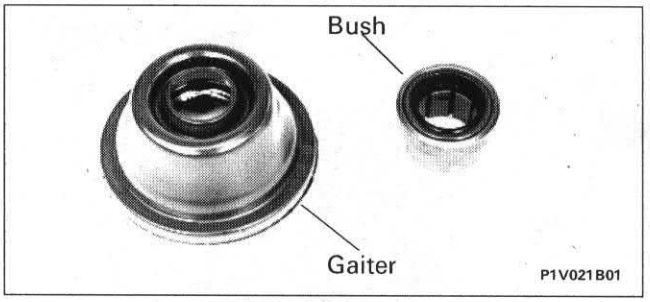
Ensure that the reference marks on the half casings (indicated by the arrows) coincide.

Lubricate the parts with gearbox oil before final assembly.



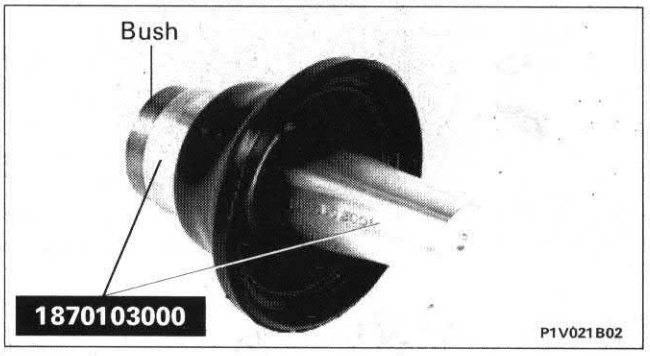
4,5 daNm

Tightening the crown wheel and differential half casings to the corrent torque

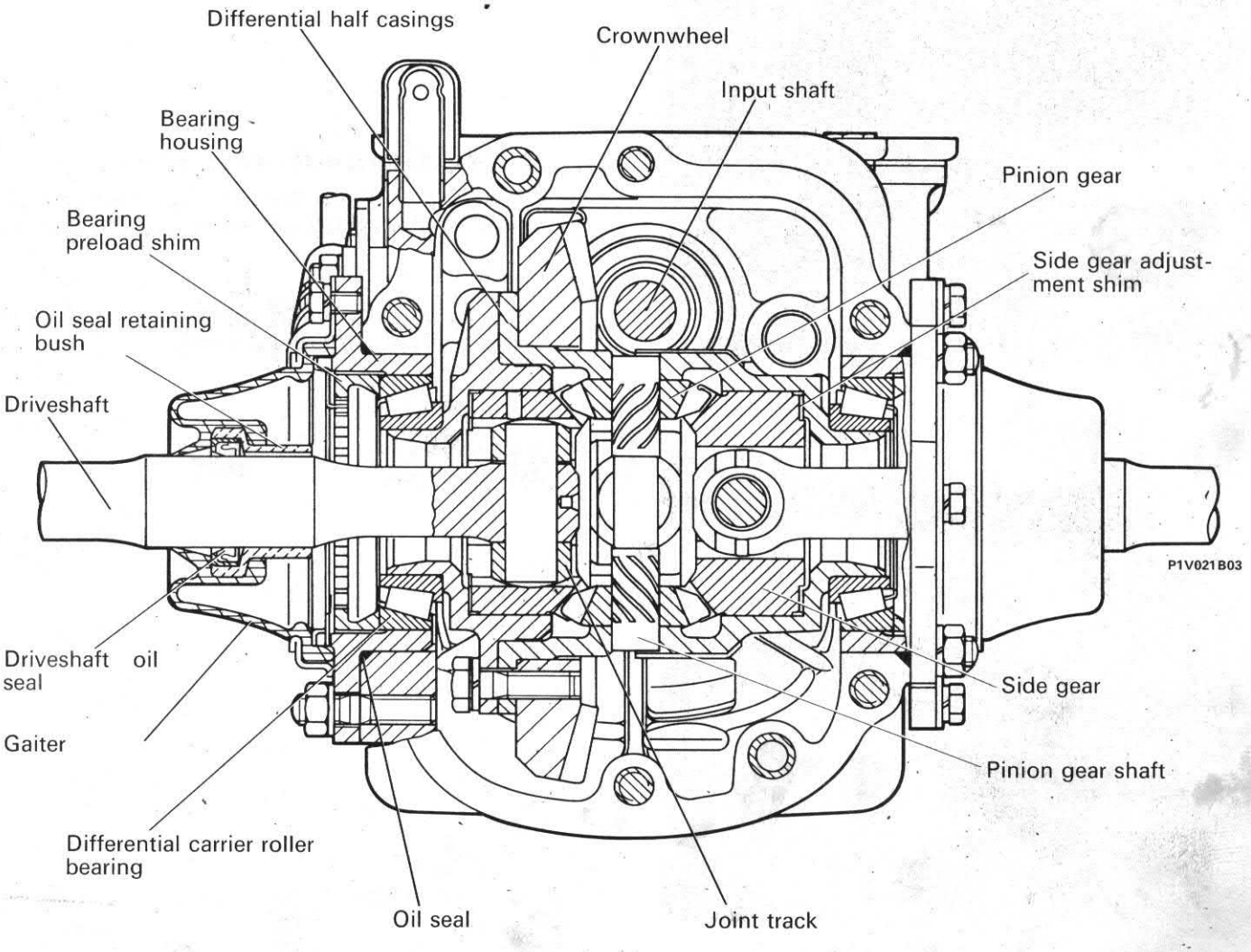


Fitting driveshaft gaiter bush

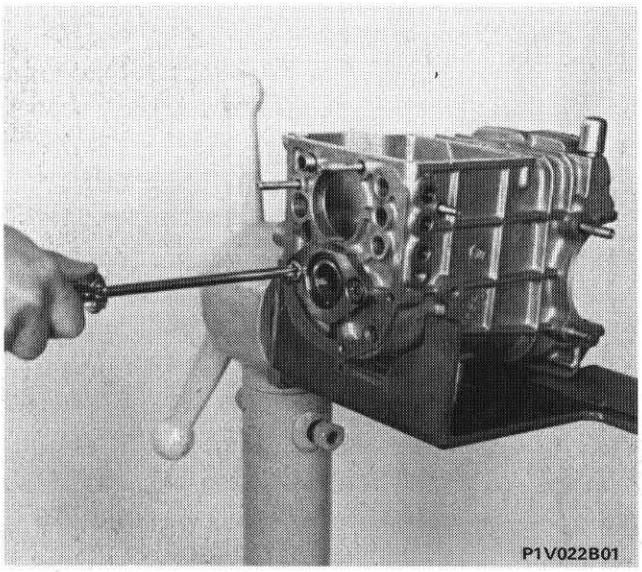
Grease tool 1870103000 to facilitate assembly of the bush in the gaiter.



Cross-section of the gearbox/differential assembly on the driveshafts



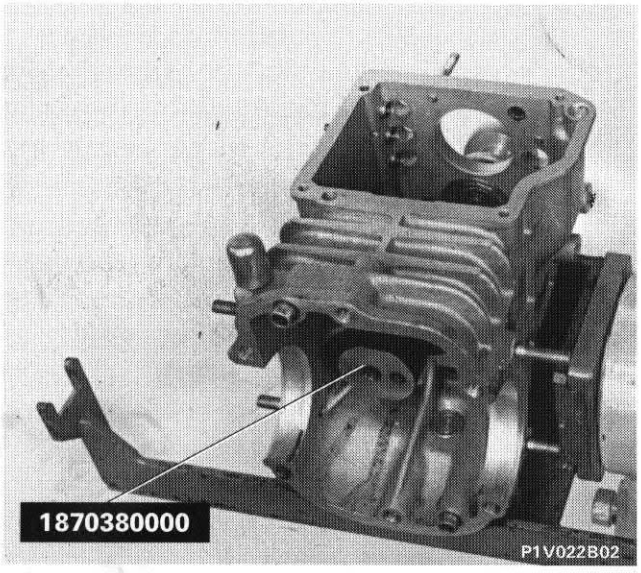
21-27.



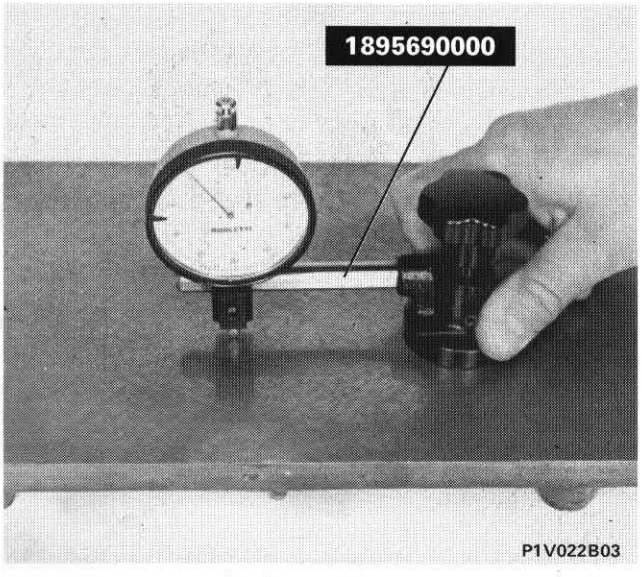
CALCULATING THICKNESS "T" OF PINION ADJUSTMENT SHIM

$$T = 0.90 + a - (\pm \frac{b}{100}) - c$$

Fitting rear bearing and plate

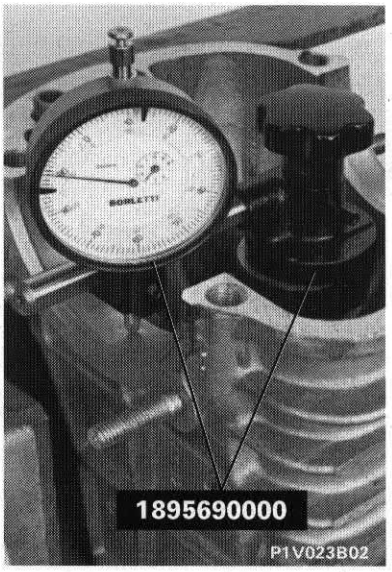


Positioning dummy pinion on gearbox casing



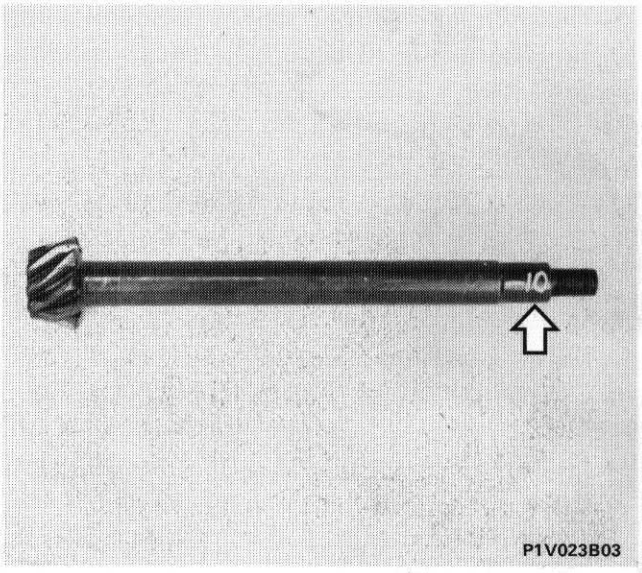
Resetting dial indicator on a reference surface

A preload of 1 mm should be set because "a" can sometimes be a negative value.



Measuring "a"

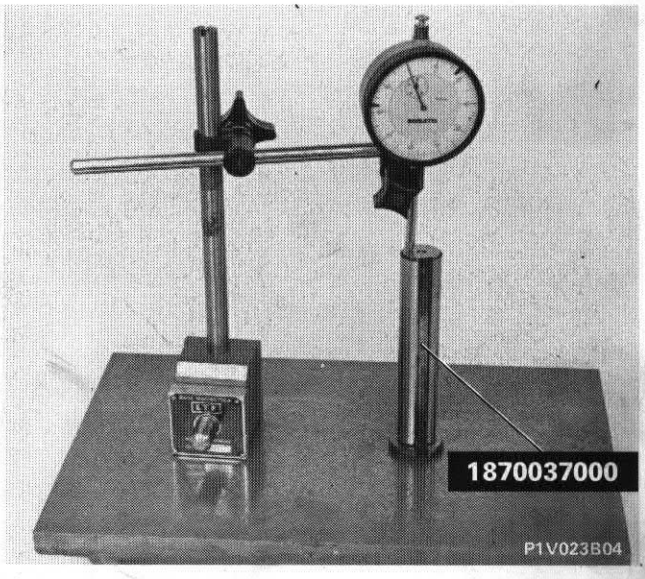
"a" = Average value of dial indicator readings taken on the supports



Measuring "b"

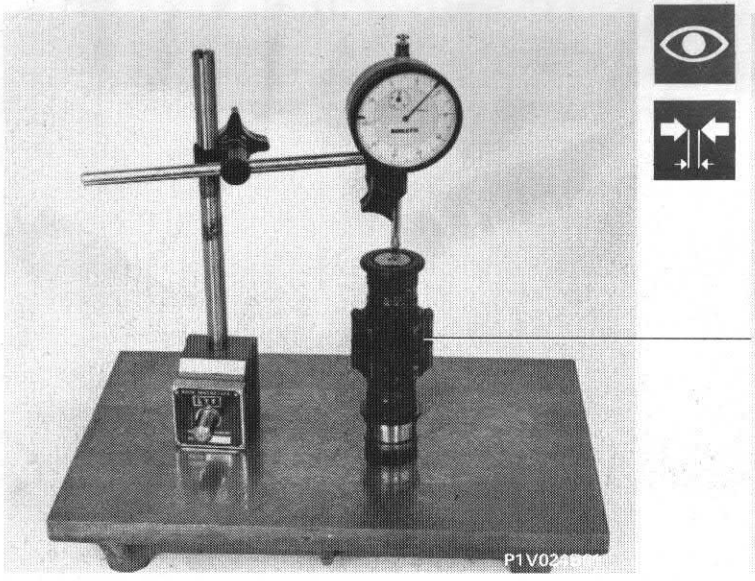
"b" = Value engraved on pinion shank

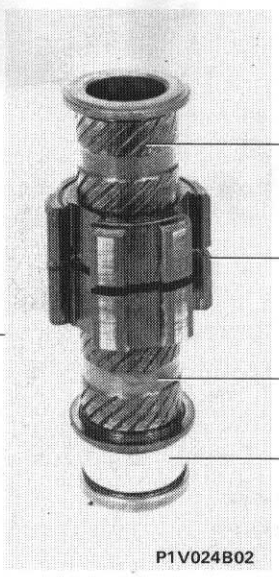
The arrow indicates the area where "b" is engraved. The number indicating "b" (in hundredths of a mm) is preceded by a plus (+) or minus (–) sign.



Resetting the dial indicator on dummy shaft 1870037000

21-27.





Components of the "c" train

- 3rd gear bush
- 3rd-4th gear hub
- 4th gear bush
- Pinion bearing inner race

Measuring "c"

"c" = Difference between height readings of geartrain and dummy shaft.

NOTE *The geartrain height must always be greater than the dummy shaft height; if not, the bushes must be renewed.*

Replacement pinion adjustment shims are supplied in the following thicknesses: 0.10 - 0.15 mm.

NOTE *After calculating the correct thickness "T" of the adjustment shims, use the appropriate replacement shims to obtain a thickness as close as possible to that calculated.*

Example

0.90 = fixed value

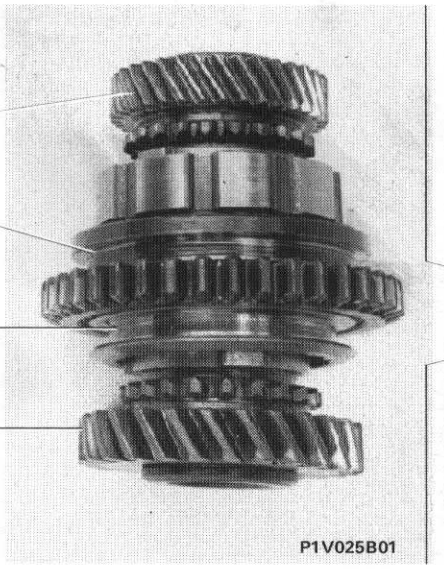
$$S = 0.90 + a - (\pm \frac{b}{100}) - c$$

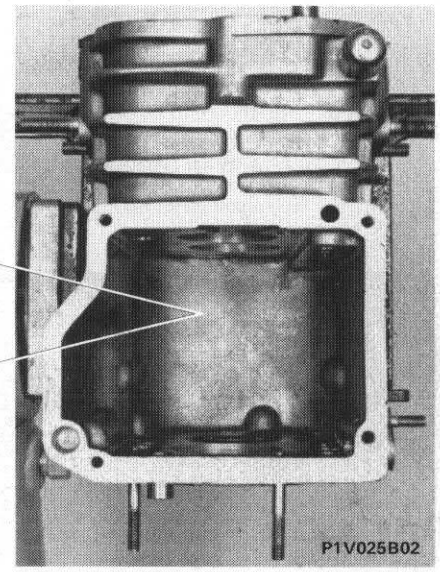
If "b" engraved on the pinion shank is a positive value:

$$T = 0.90 + a - (+ \frac{b}{100}) - c = 0.90 + a - (\frac{b}{100}) - c$$

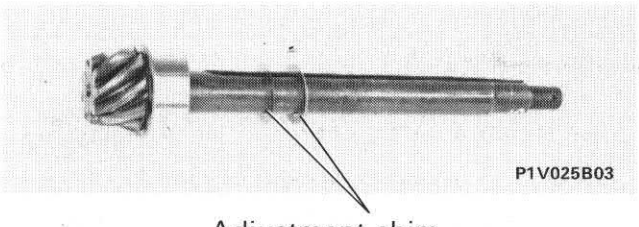
If "b" engraved on the pinion shank is negative:

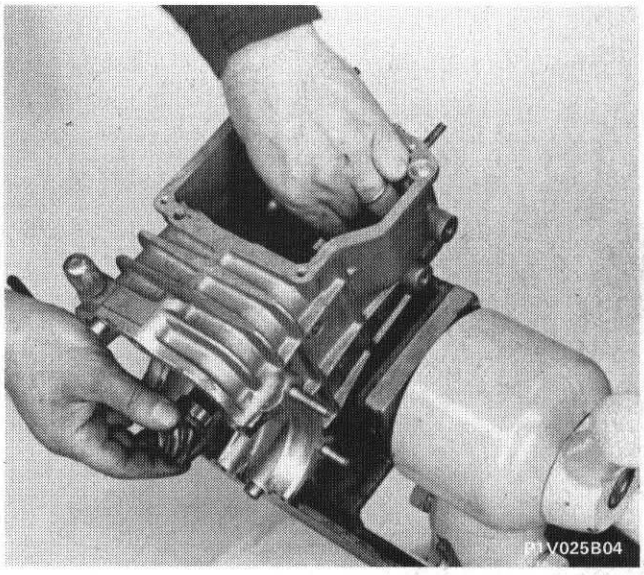
$$T = 0.90 + a - (- \frac{b}{100}) - c = 0.90 + a + (\frac{b}{100}) - c$$



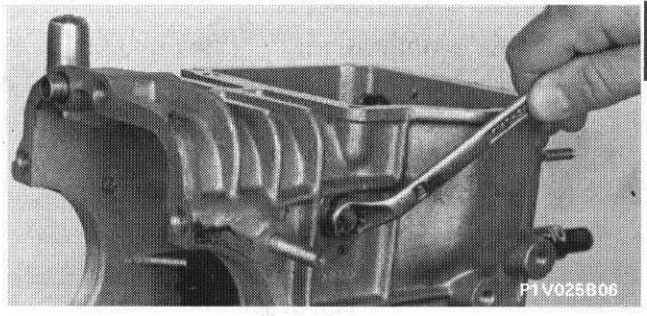


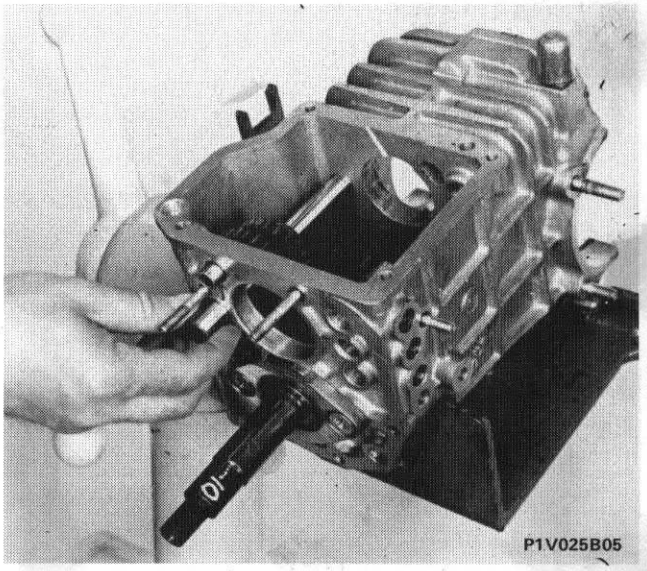
Preparing countershaft gear-train and positioning in gearbox casing





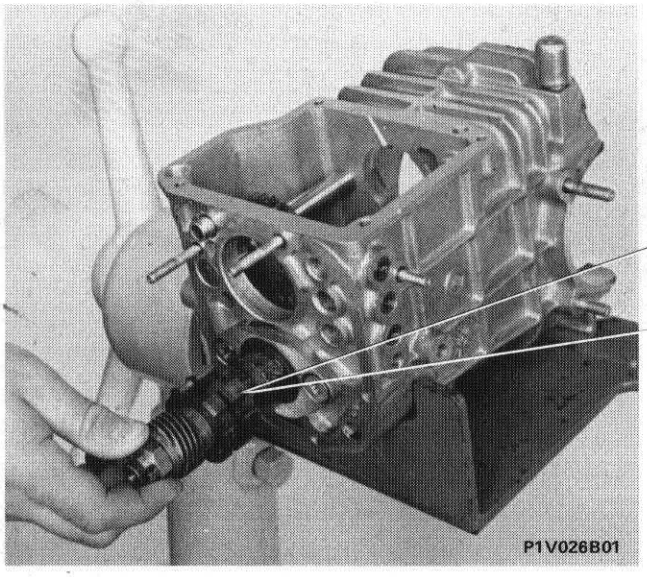
Fitting countershaft (pinion) in gearbox casing and other components

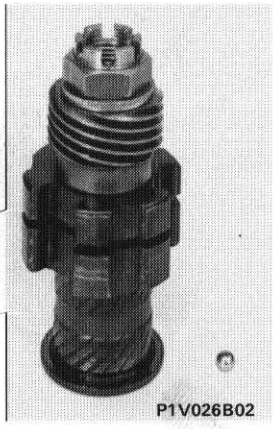




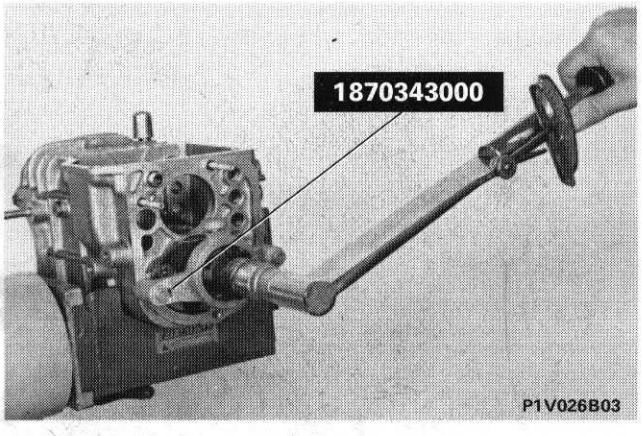
Fitting reverse idler shaft and reverse gear

21-27.



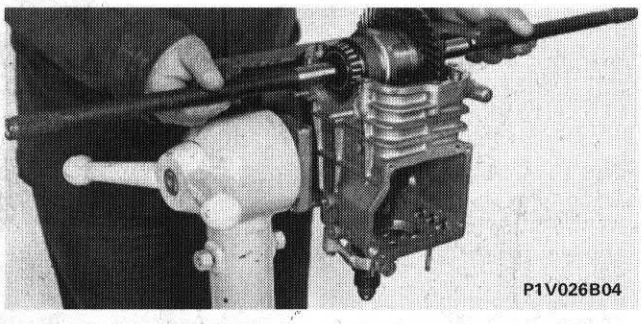


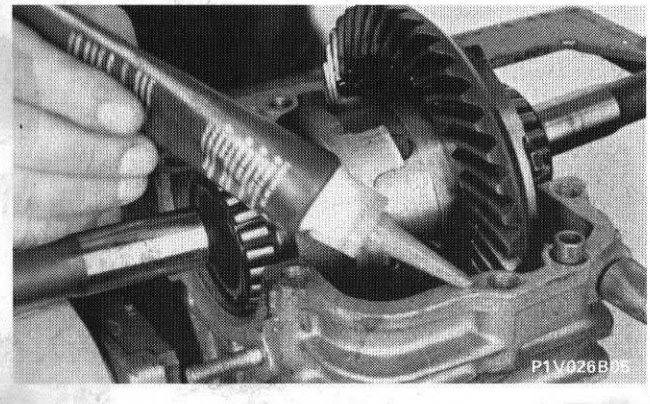
Fitting rear bearing, 2nd gear bush and hub and speedometer drivegear



4,9 daNm

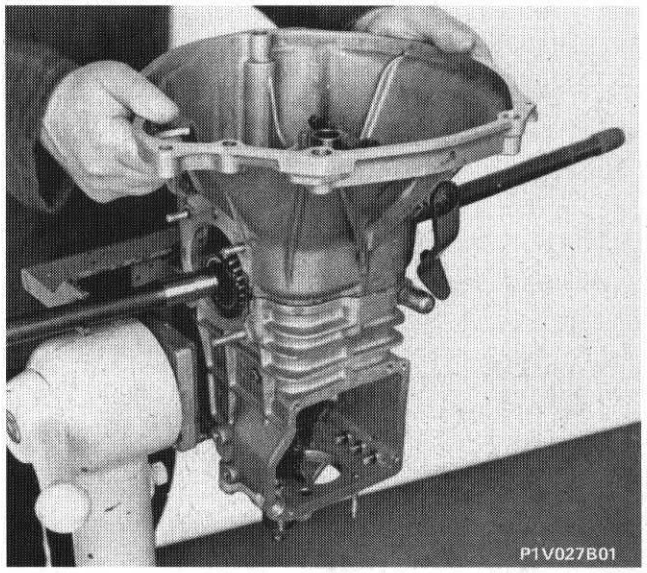
Fitting tool 1870343000 (for locking pinion while measuring pinion-to-crownwheel backlash) and tightening countershaft retaining nut to the correct torque





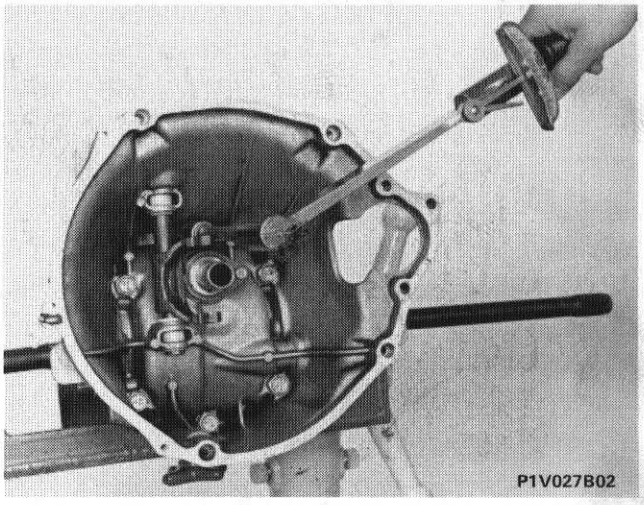
Fitting differential unit complete with driveshafts

*Smear **Ermetico Optimus 854365** on the surface between gearbox casing and bellhousing.*



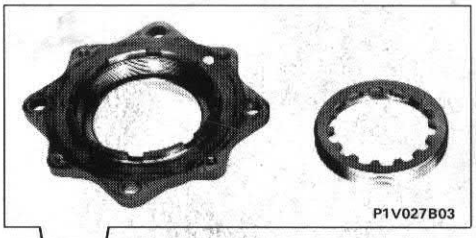
Fitting bellhousing to engine

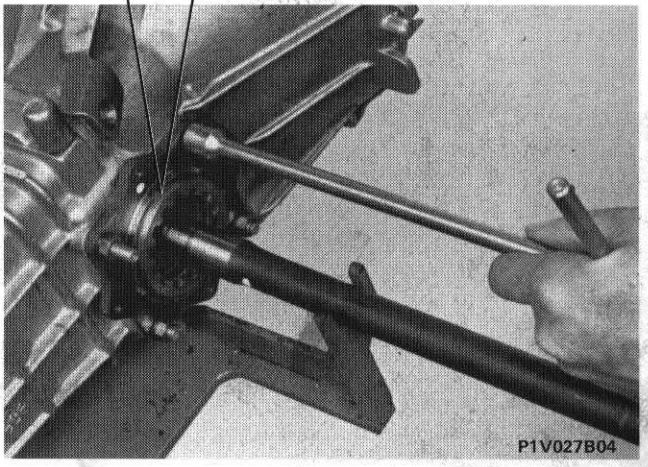
3,4 daNm



Tightening bellhousing gearbox bolts to the correct torque

The bellhousing/gearbox bolts should be tightened to the correct torque after the bearing housings have been fitted.



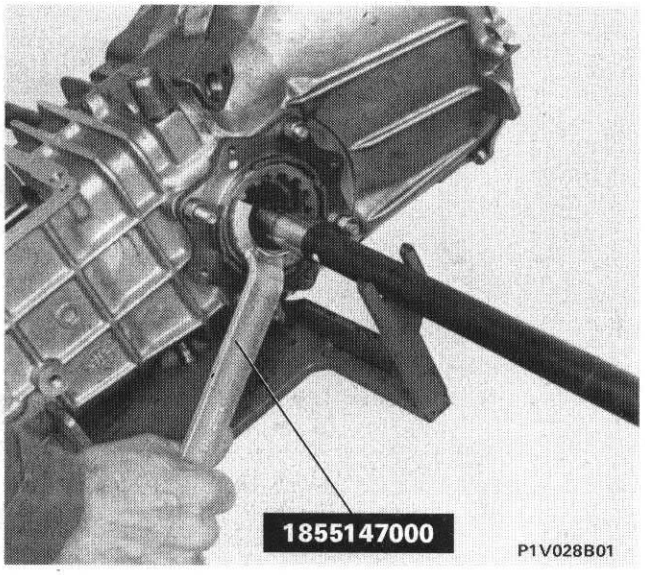


Fitting bearing housings and preload shims

NOTE *Smear the bearing housing and gearbox casing surfaces with* ***Ermetico Optimus 854365.***

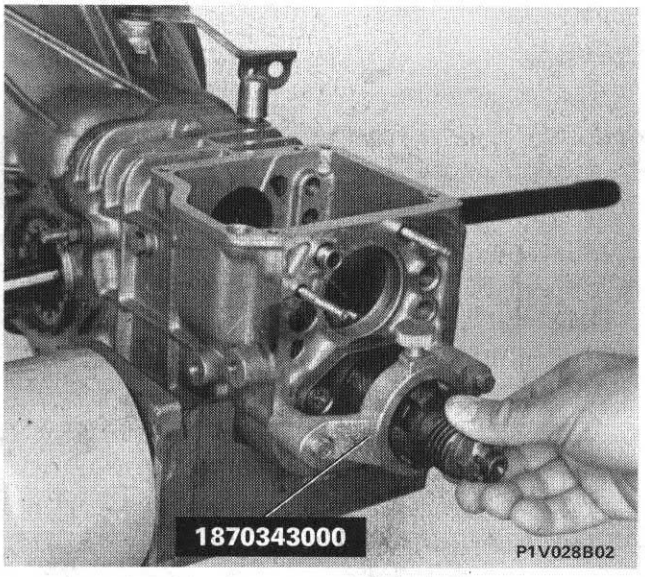
The preload shims must be left unrestrained to allow free bearing movement.

21-27.



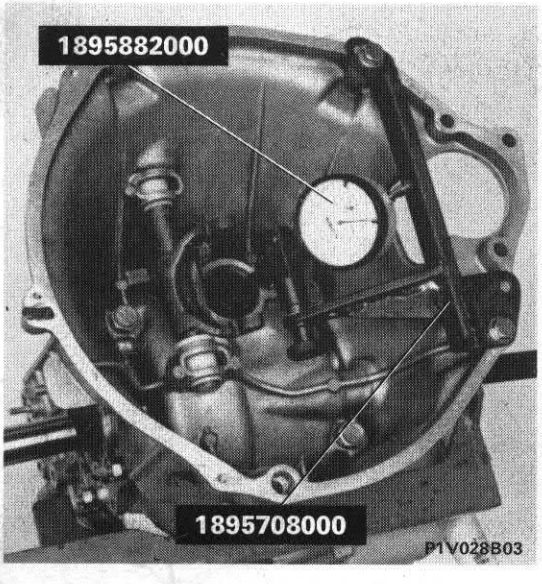
Tightening differential preload shims (to allow the bearings to bed in)

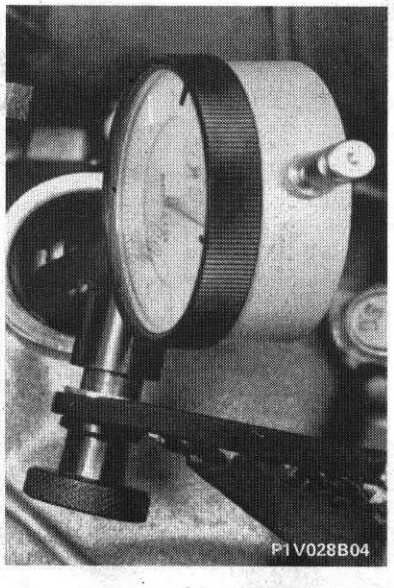
Use tool 1855147000 to tighten the shims until resistance is felt (starting from shim on crownwheel side).



Bedding in differential bearings

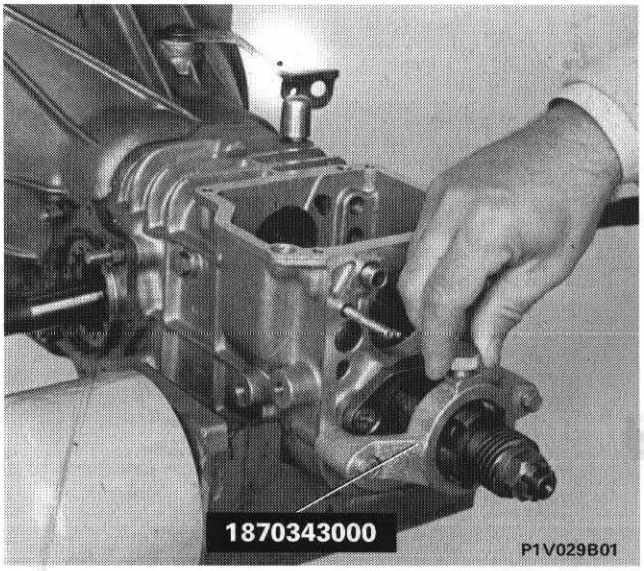
Slacken the locking bolt on tool 1870343000 and rotate the countershaft by several revolutions to allow the differential bearings to bed in.



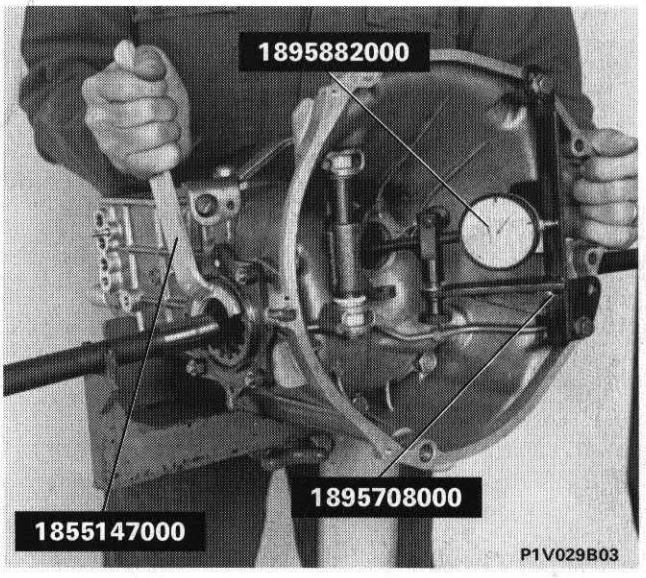


Checking pinion to crownwheel backlash

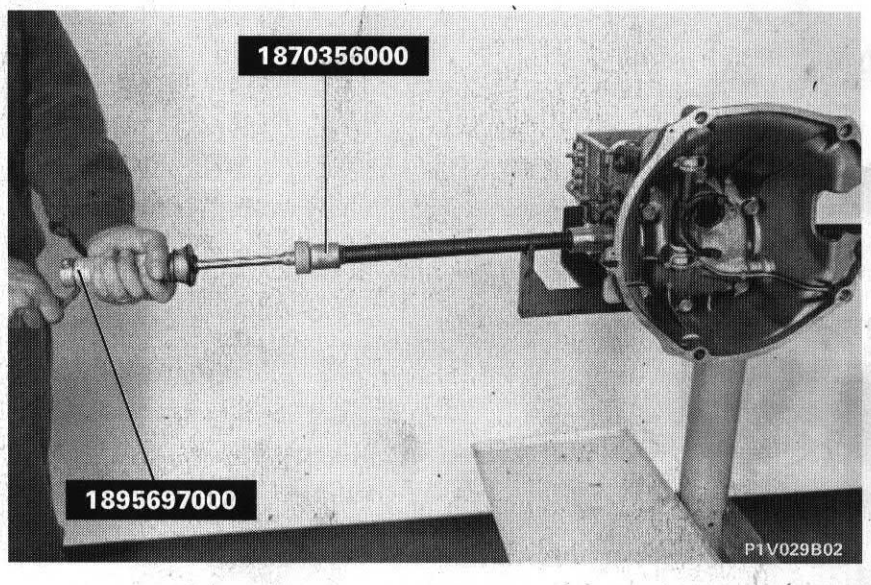
The backlash must be 0.08 - 0.13 mm, and is best checked on at least four points of the crownwheel.



Before each individual measurement of the pinion to crownwheel backlash, ensure that the pinion is locked by the bolt on tool 1870343000



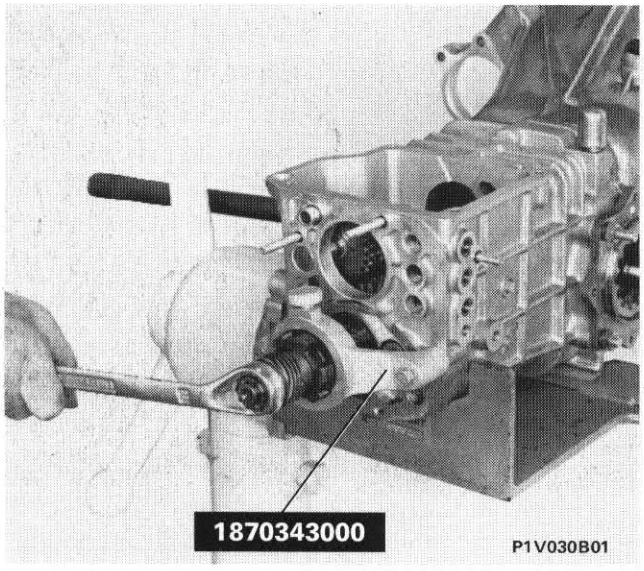
Adjusting pinion-to-crownwheel backlash



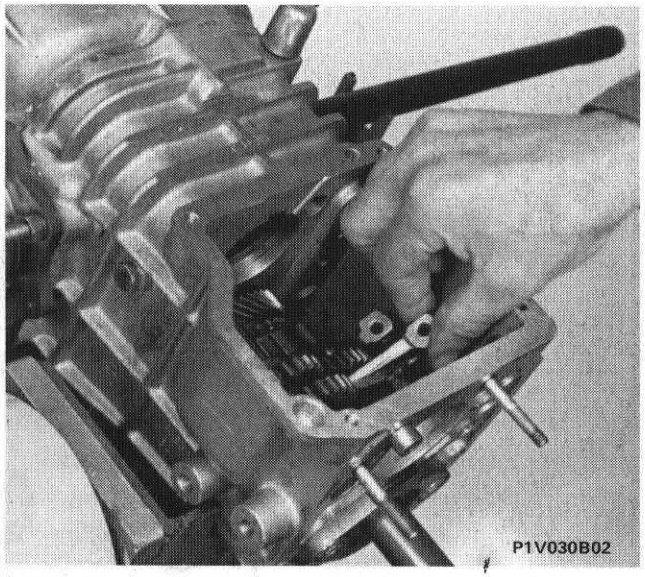
Checking differential carrier roller bearing preload

The preload must be 128 - 147 Ncm (13 - 15 kgcm).
If it is incorrect, turn the preload shims by the same amount so as not to alter the pinion-to-crownwheel backlash.

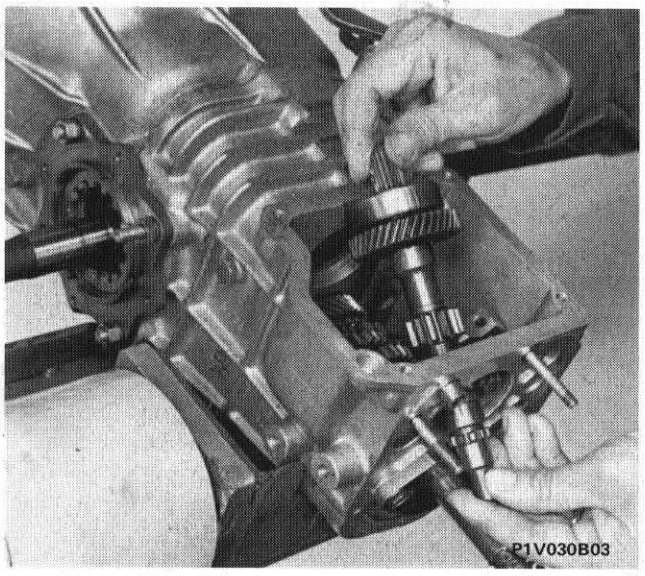
21-27.



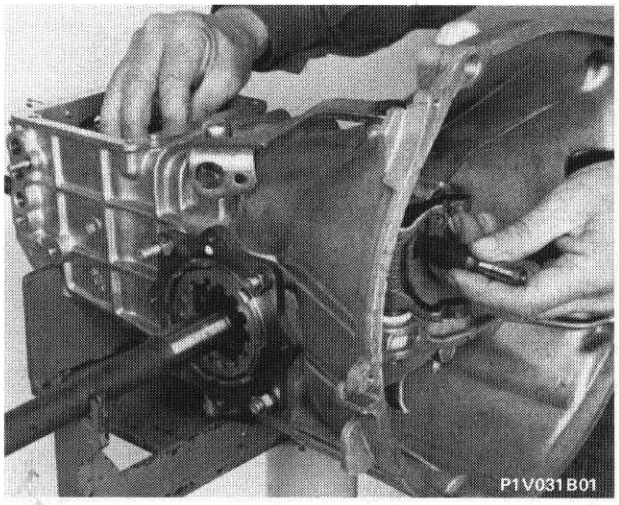
Dismantling 2nd gear train, speedometer drivegear and tool 1870343000

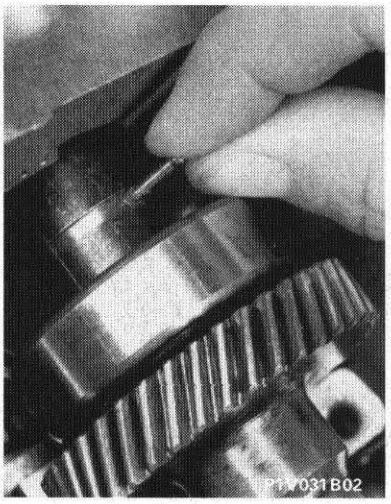


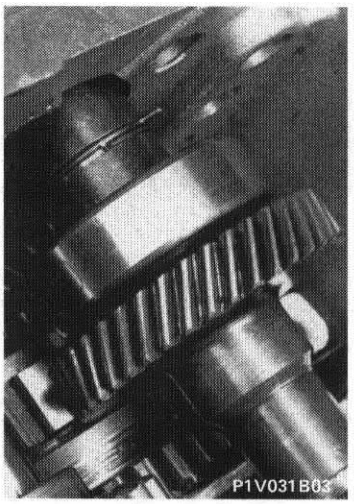
Fitting 1st gear and 3rd-4th gear selector forks



Fitting mainshaft and front bearing



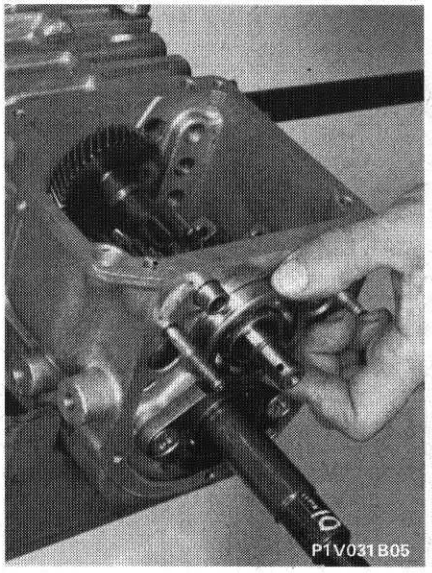


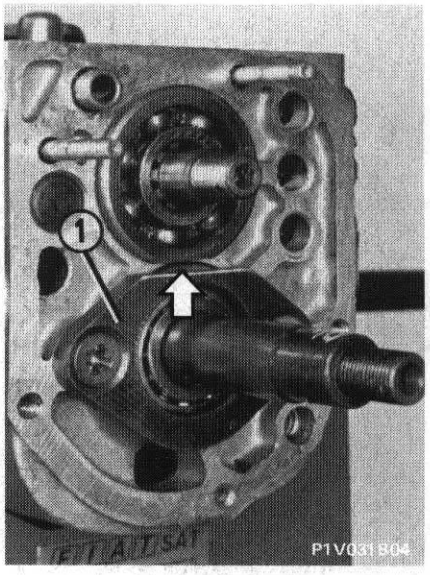


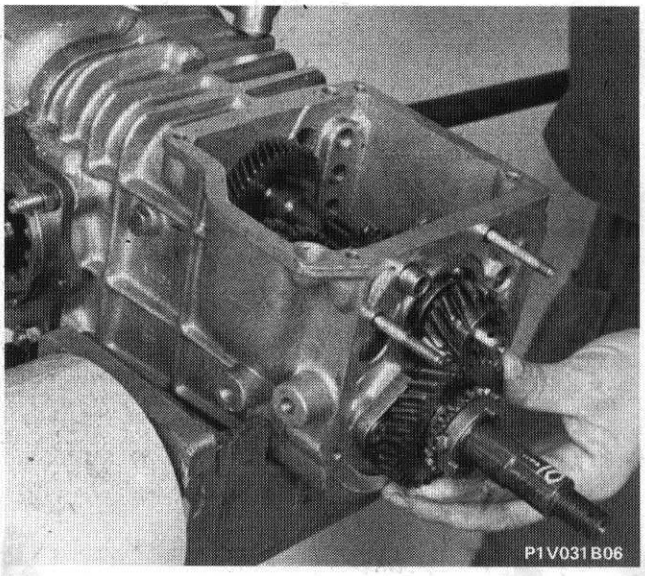
Fitting input shaft with locking pin and spring clip

Fitting mainshaft bearing, rear side

Fit the bearing with the flat edge (indicated by the arrow) facing the retaining plate (1).

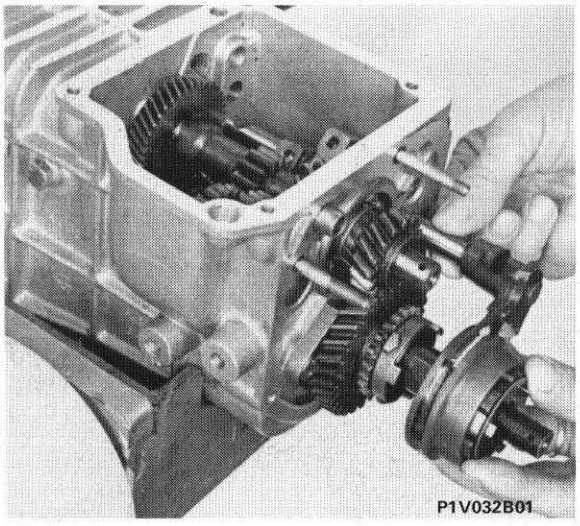


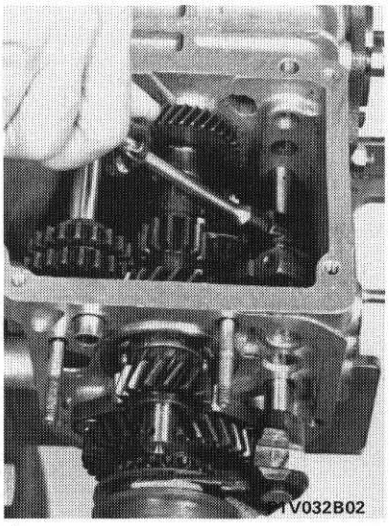


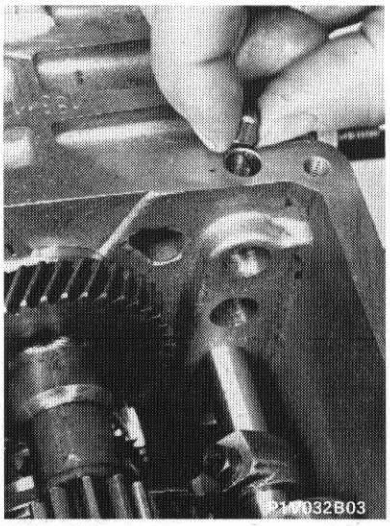


Fitting 2nd speed gears with bush and synchronizer

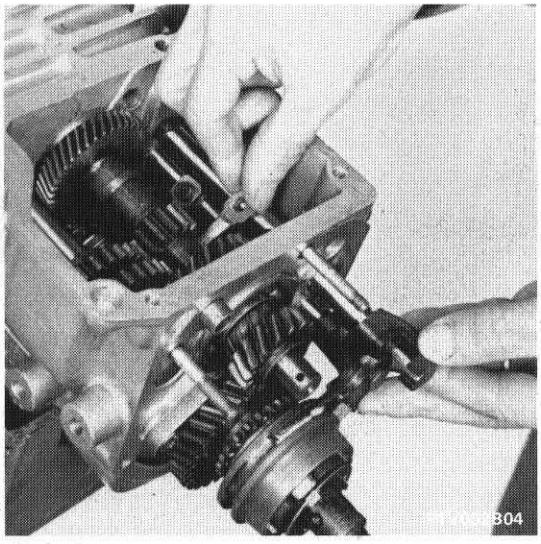
21-27.

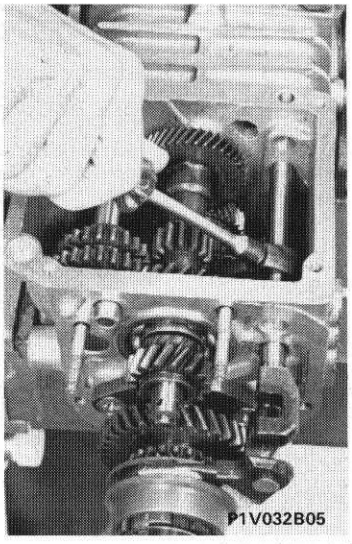


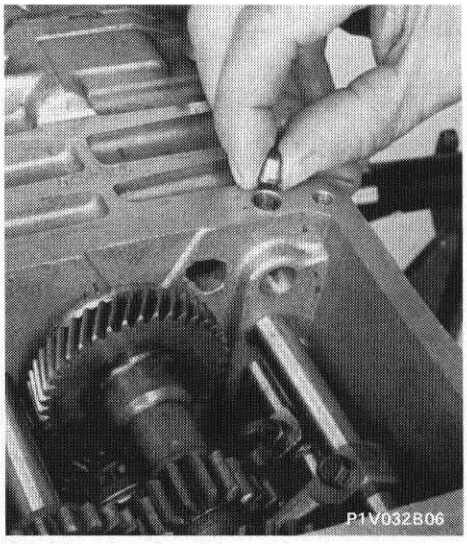




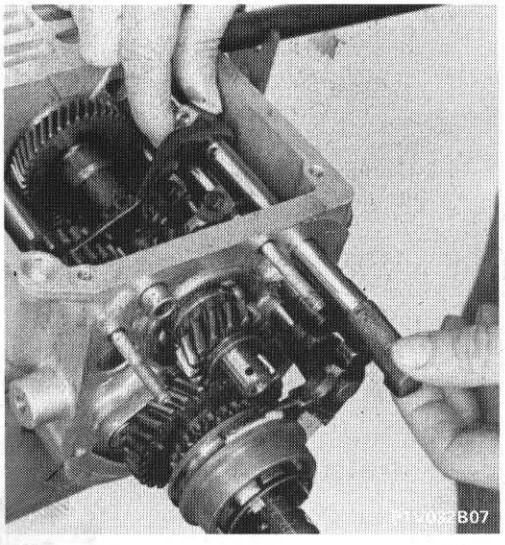
Fitting 1st-2nd gear selector rod with 2nd gear synchro sleeve, hub, sliding keys and plate. Tightening 1st gear selector fork and fitting pawl

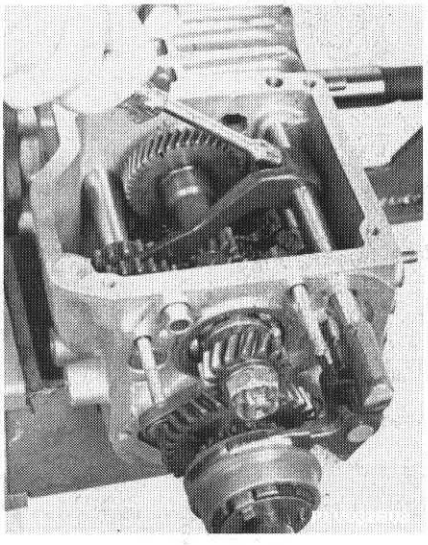




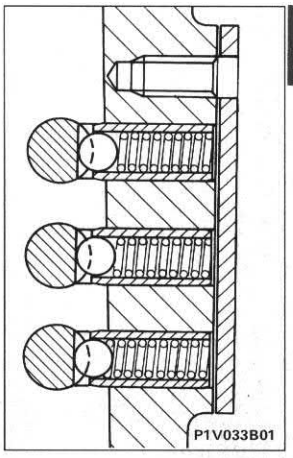


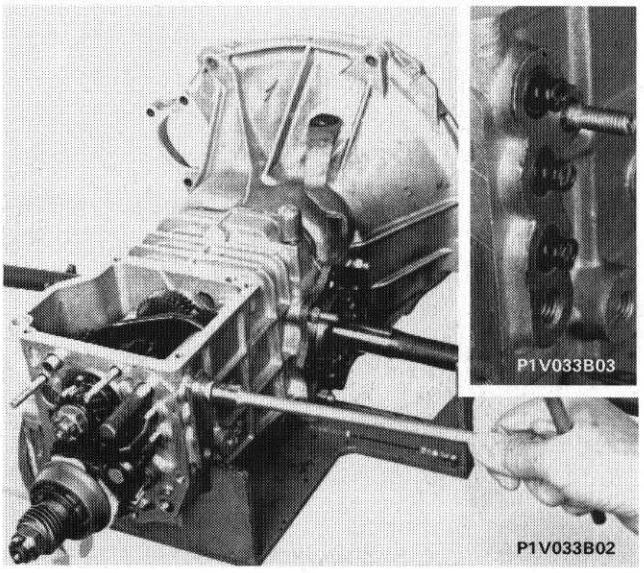
Fitting 3rd-4th gear selector rod. Tightening 3rd-4th gear selector fork and fitting pawl





Fitting and tightening reverse selector rod and fork

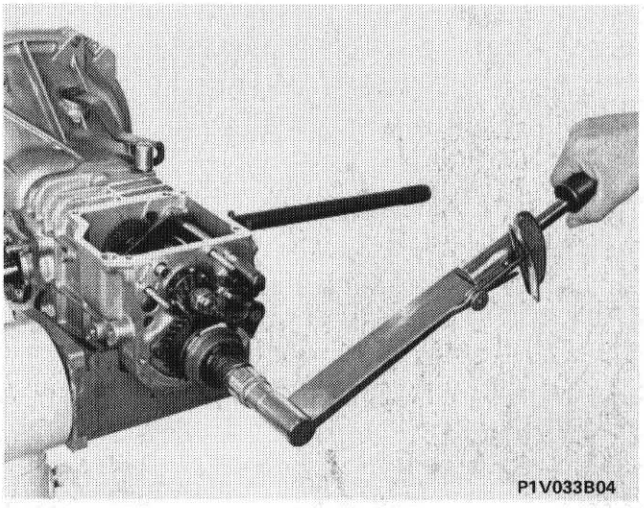




Fitting detent balls and springs

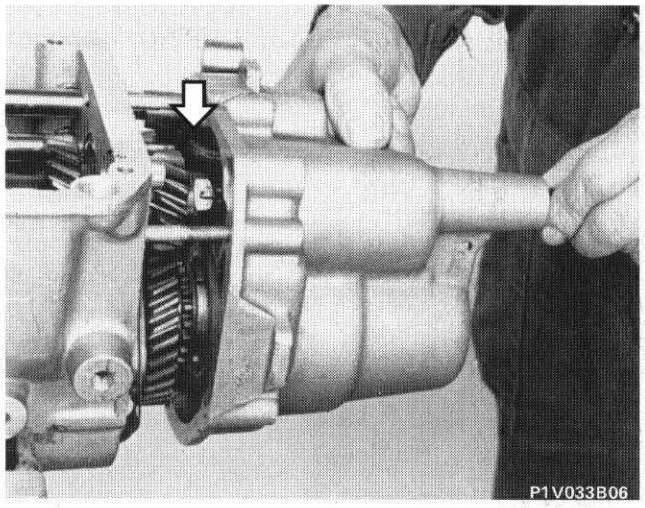
Lightly lubricate the seal before final assembly

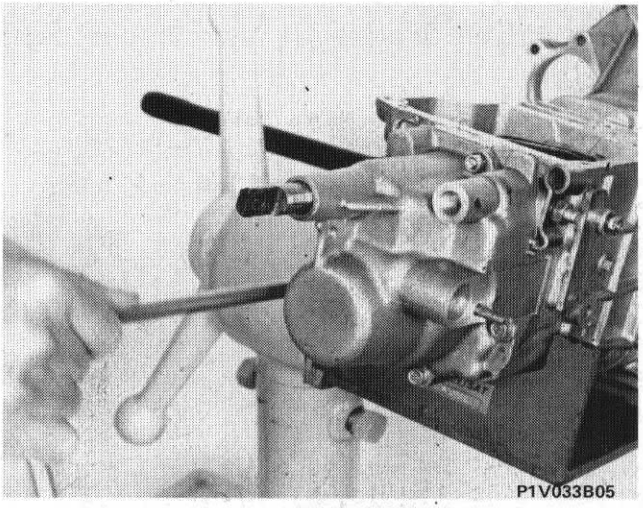
4,9 daNm



Fitting speedometer drivegear and tightening mainshaft and countershaft locking nuts

To stop the shafts rotating, engage two gears simultaneously (4th gear and reverse). If at the specified torque the notch on the nut does not line up with the hole on the shaft, continue tightening until the cotter pin can be inserted.



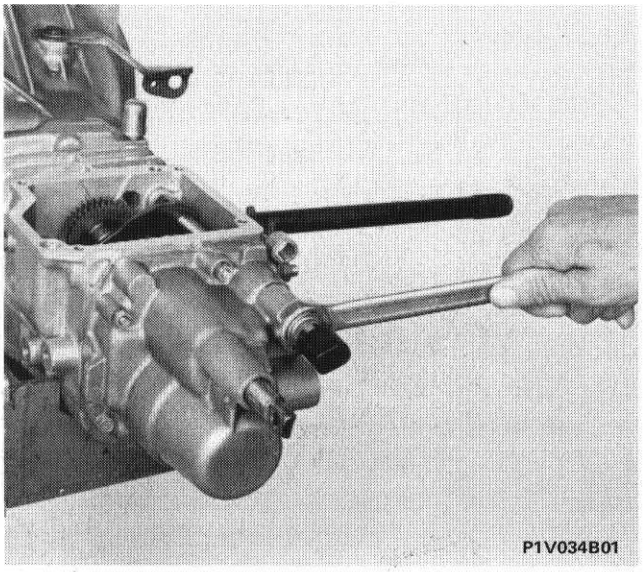


Fitting rear cover with gear engagement lever

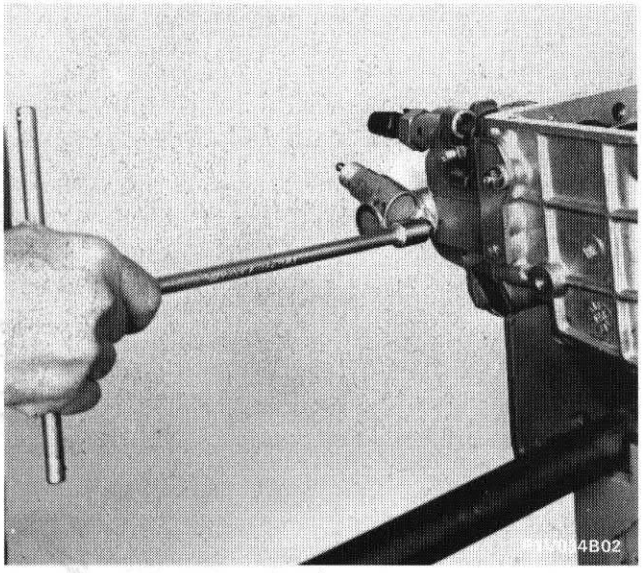
Ensure that the gear engagement lever is inserted in the selector rod strikers.

Lightly lubricate the seal before final assembly.

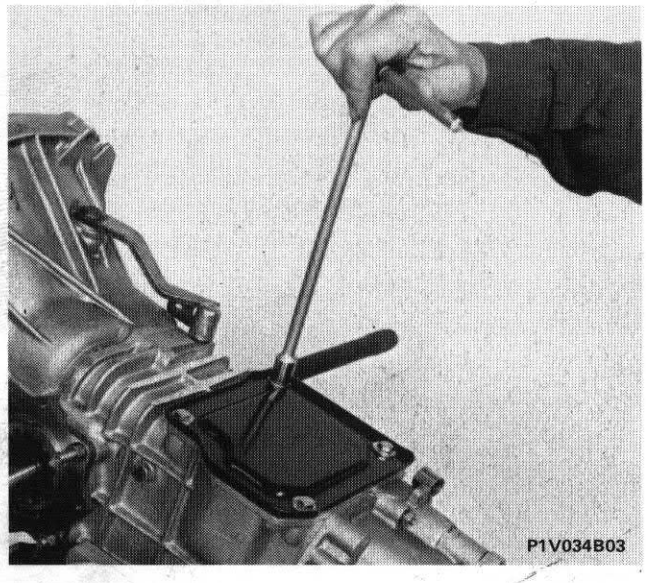
21-27.



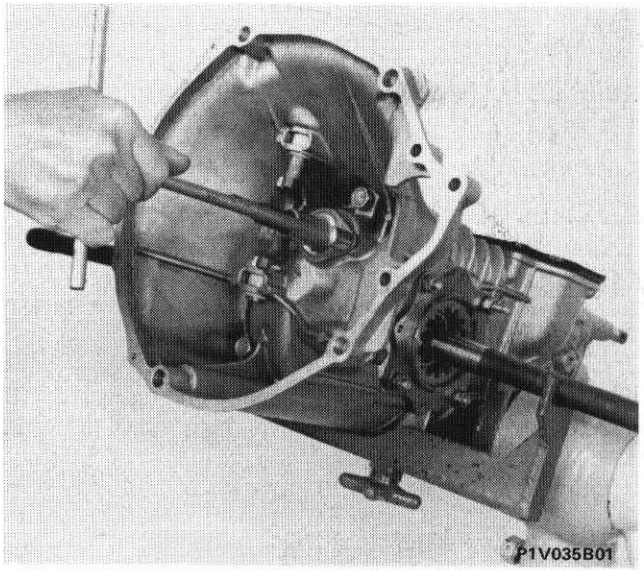
Fitting reversing light switch



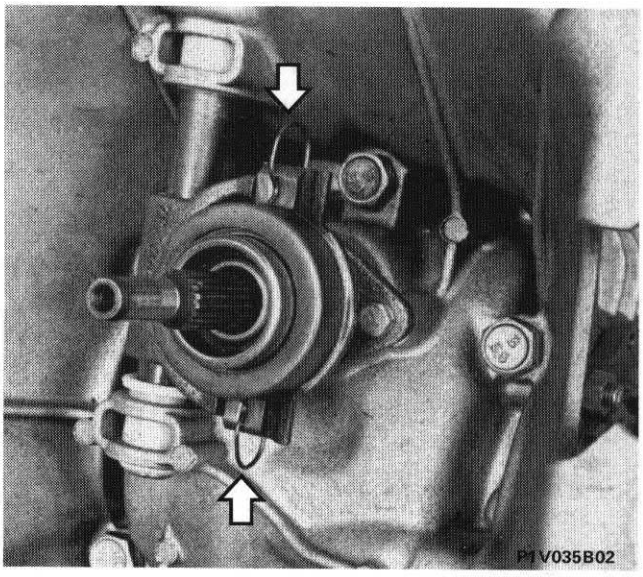
Fitting speedometer drive housing



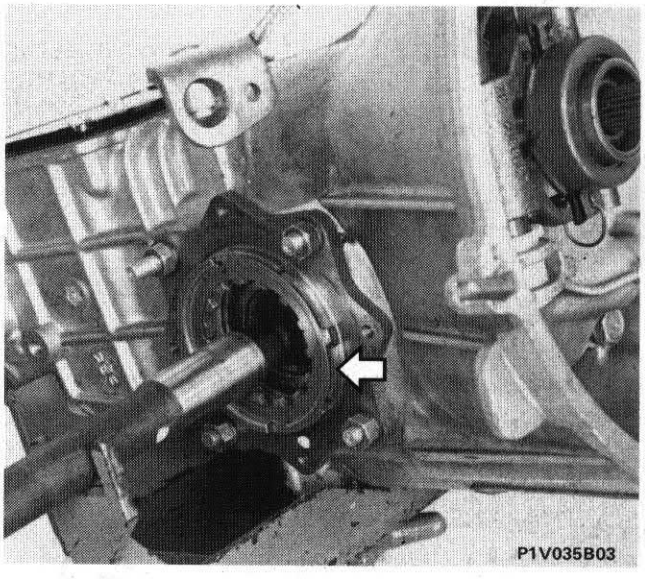
Fitting top cover



Fitting clutch release bearing sleeve

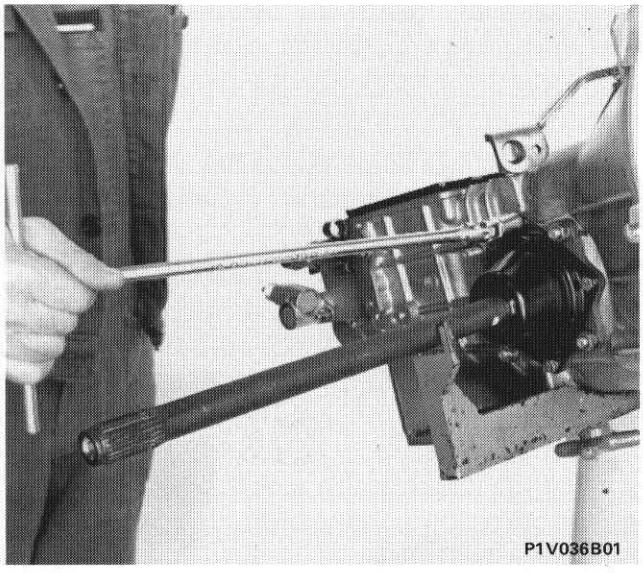


Fitting release bearing and retaining clips (indicated by the arrows)

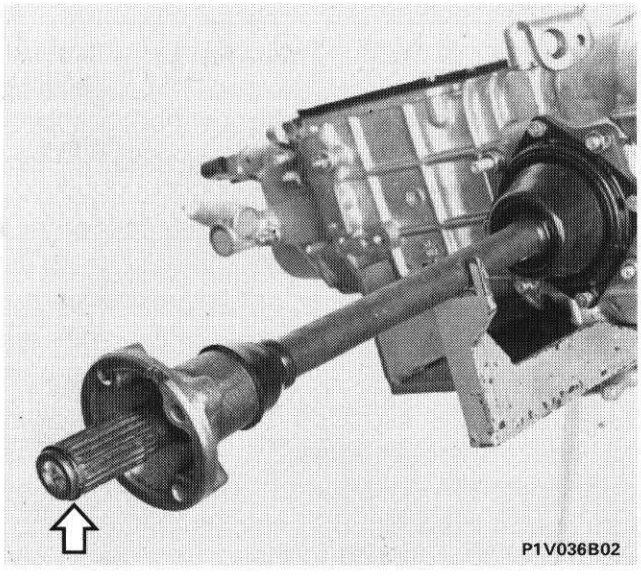


Fitting preload shim retaining plates

21-27.

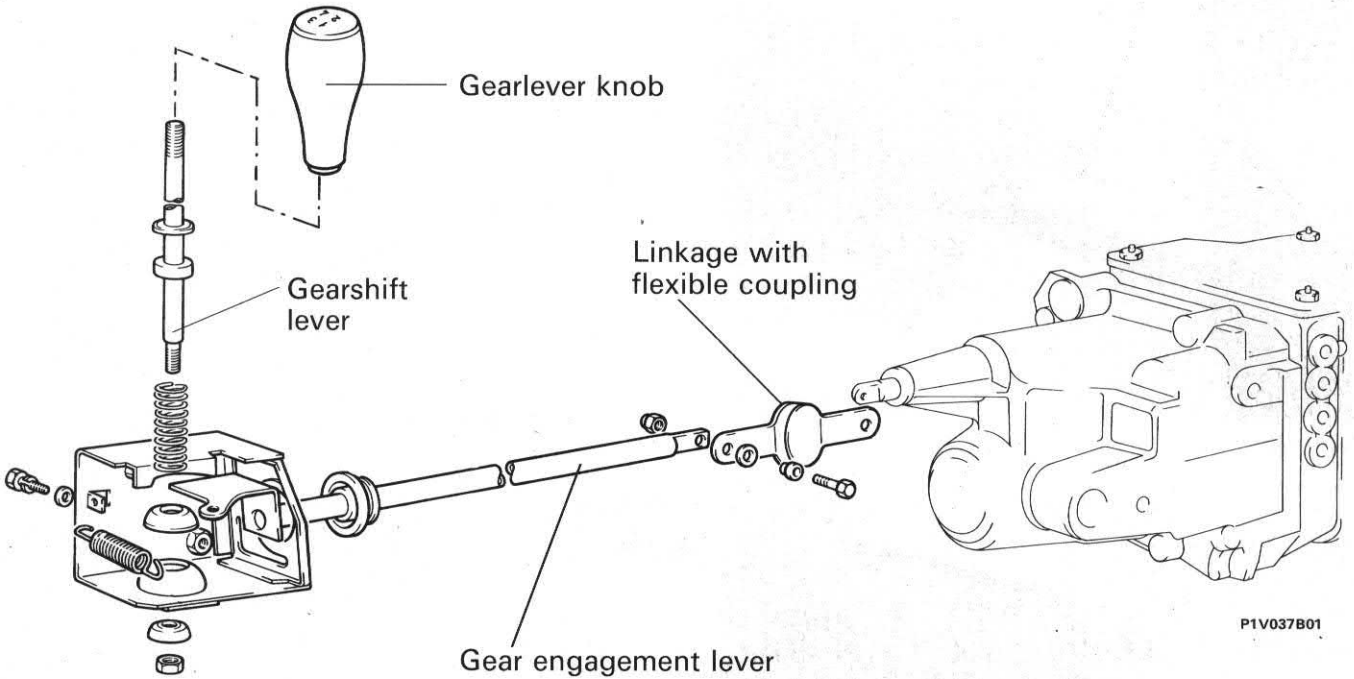


Fitting gaiter



Fitting sleeves joining driveshafts to wheel couplings and retaining clip (indicated by the arrow)

GEARSHIFT LINKAGES



21-27.A

1840005000 Universal extractor

1840206000 Impact extractor (to be used with specific accessories)

1840207813 Accessory (∅14-18 mm) for extracting bellhousing sleeve bush (to be used with 1840206000)

1850113000 Gearbox drain plug spanner (12 mm)

1855083000 Gearbox oil level plug spanner (13 mm)

1855147000 Adjustment spanner for differential carrier bearing preload shims

1870037000 Reference shaft for measuring total length of pinion gears and bearings (use with 1895684000)

1870342000 Tool for fitting oil seal on gearbox front cover

1870343000 Tool for locking 2nd synchro sleeve during measurement of pinion-to-crownwheel backlash

1870356000 Accessory for checking differential bearing preload (use with 1895697000 and 1855147000)

1870380000 Tool for calculating pinion adjustment shim thicknesses (use with 1870404000)

1870404000 Dial indicator bracket, for depth or projection measurements (use with 1895883000 and 1870380000)

1870414000 Crossbar for supporting engine during removal/refitting of bearbox/differential

1870438000 Part for extracting differential carrier inner bearing races (use with 184005001, 184005312 and 1840054000)

1870600000 Bracket for supporting gearbox-/differential during removal and refitting

1871001007 Bracket for supporting gearbox-/differential unit during overhaul (mount on 1861000000 or 1871000000)

1895697000 Dynanometer (0-4.90 Nm scale) for measuring bearing preload

1895708000 Tool for measuring pinion-to-crownwheel backlash (use with 1895882000)

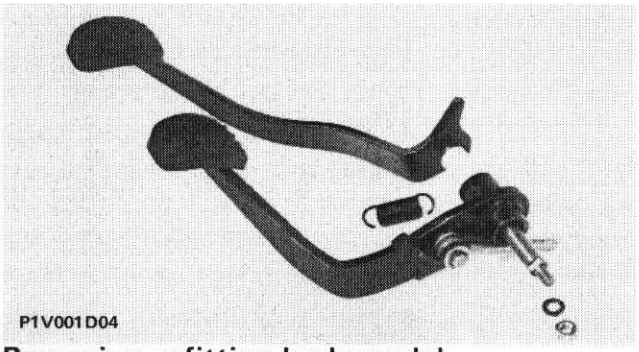
1895882000 Dial indicator (0.001 mm graduations) for use with special tools (measurement capacity 10 mm, shank length 88 mm)

1895883000 Dial indicator (0.001 mm graduations) for use with special tools(measurement capacity 10 mm, shank length 60 mm)

PART	Thread	Torque wrench settings
		daNm
Starter motor bolt	M 8	2.5
Clutch cable reaction bracket nut	M 8	1.5
Nut for bellhousing stud	M 8	2.5
Bellhousing bolt	M 8	2.5
Gearbox casing/bellhousing bolt	M 10 x 1.25	3.4
Gearbox countershaft with nut and cotter pin	M 14 x 1.5	4.9 (*)
Mainshaft nut and cotter pin	M 14 x 1	4.9 (*)
Reverse idler shaft bolt	M 8	1.5
Selector fork bolt	M 5	0.83
Gearshift lever bracket bolt	M 8	1.5
Self-locking nut securing inner collar to gearshift lever	M 8	1.6
Self-locking nut securing inner collar to gearshift lever	M 8	2
Self-locking nut for gear selector linkage bolt	M 6	1
Bolt securing crownwheel to differential carrier	M 8	4.5
Nut for differential bearing housing stud	M 8	1.5
Nut to be staked, securing coupling to rear wheel stub axle	M 18 x 1.5	
Bolt securing sleeve to stub axle coupling	M 8	2.5
Bolt securing bearing retaining plate	M 8	2.2

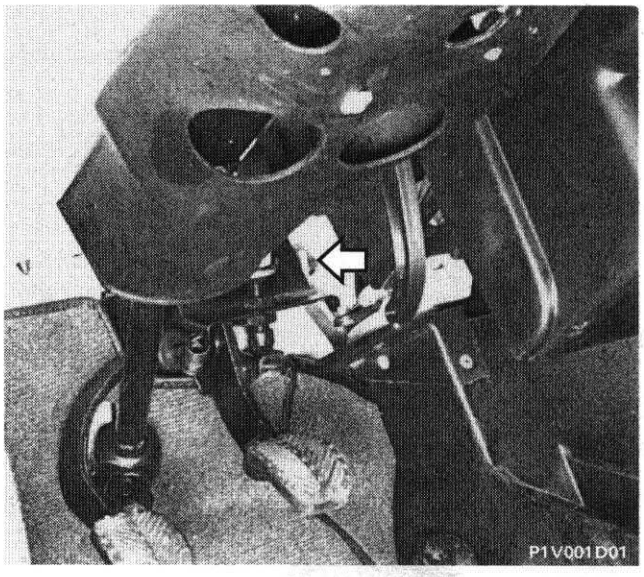
(*) If at the specified torque the notch on the nut does not line up with the hole on the shaft, continue tightening until the cotter pin can be inserted (angle less than 60°)

BRAKE PEDAL



Removing-refitting brake pedal

In order to remove the brake pedal, the nut shown by the arrow has to be undone before removing the brake pedal return spring, the clutch cable and the pedal.

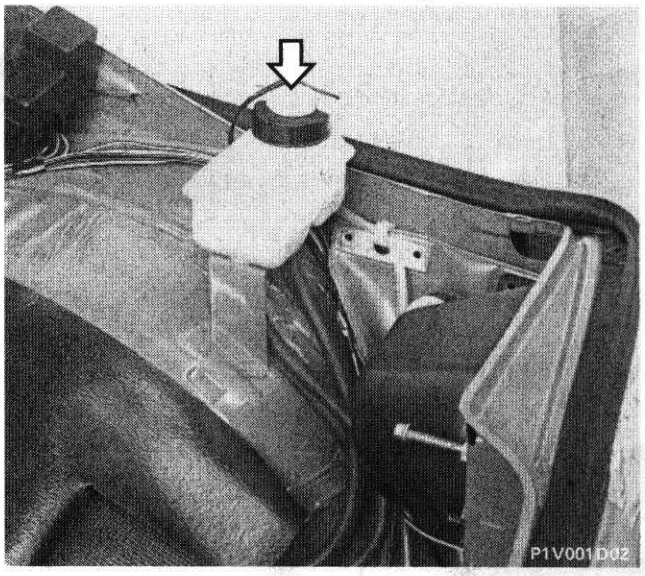


the parts concerned with grease before fitting.

BRAKE FLUID RESERVOIR

Checking insufficient brake fluid level warning device

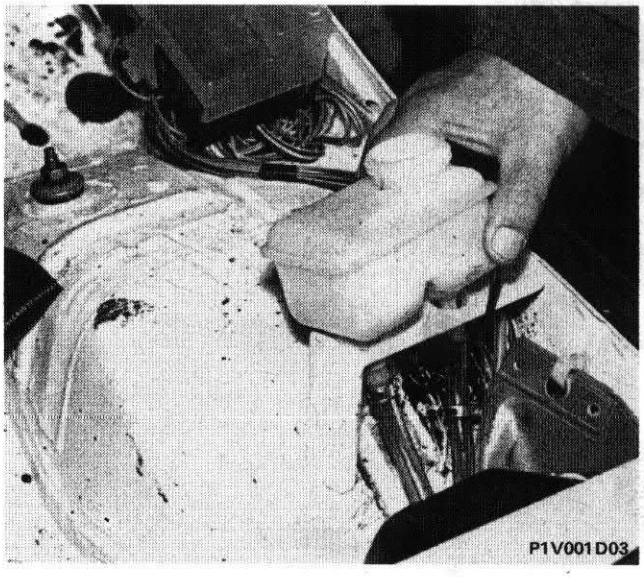
NOTE *Periodically check the operation of the warning device by pressing on the top of the reservoir cover (as shown by the arrow); with the ignition switch in the ON position the brake fluid warning light should come on.*



Removing-refitting reservoir and pipes connected to master cylinder

Before removing the reservoir, drain the brake fluid.

Bleeding hydraulic system.



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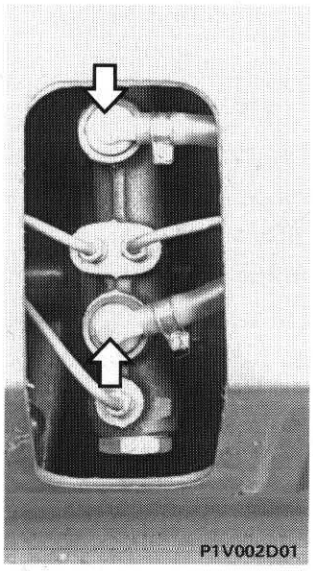
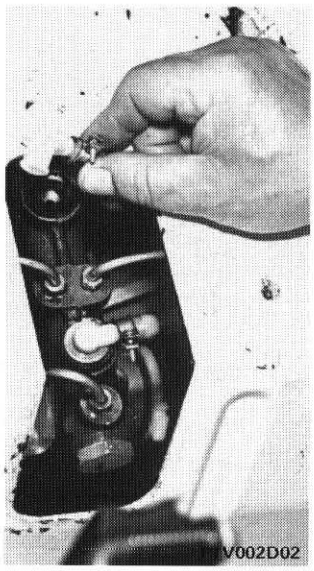
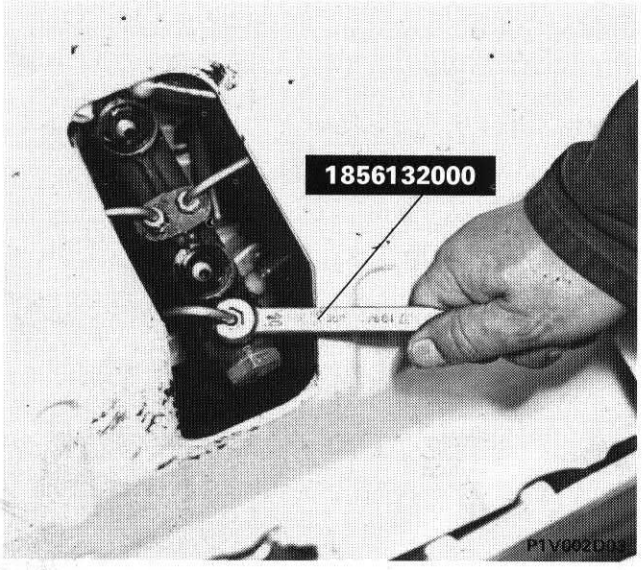




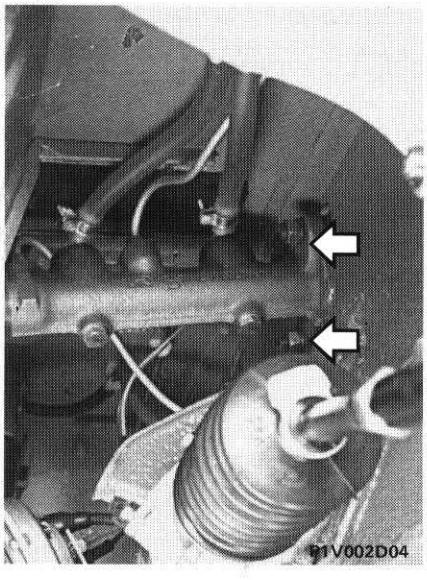
MASTER CYLINDER

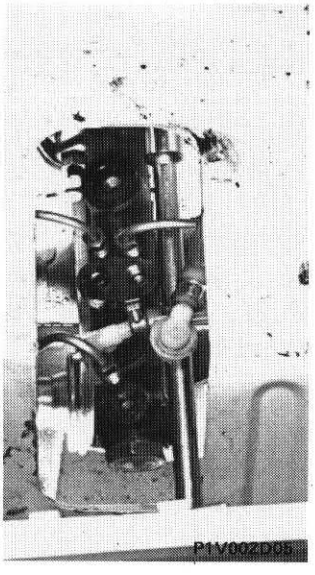
Removing-refitting pipes connecting brake fluid reservoir to master cylinder

The arrows show the pipes to be removed.



Removing-refitting brake pipes from master cylinder

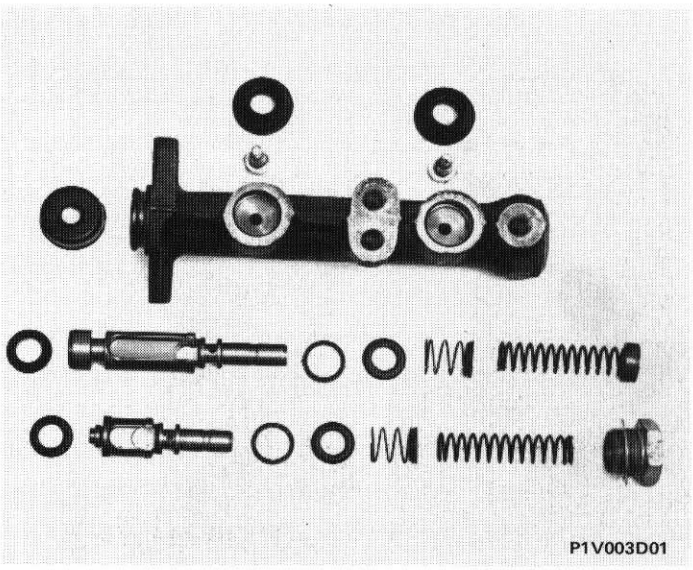




Removing-refitting master cylinder

Bleed braking system.

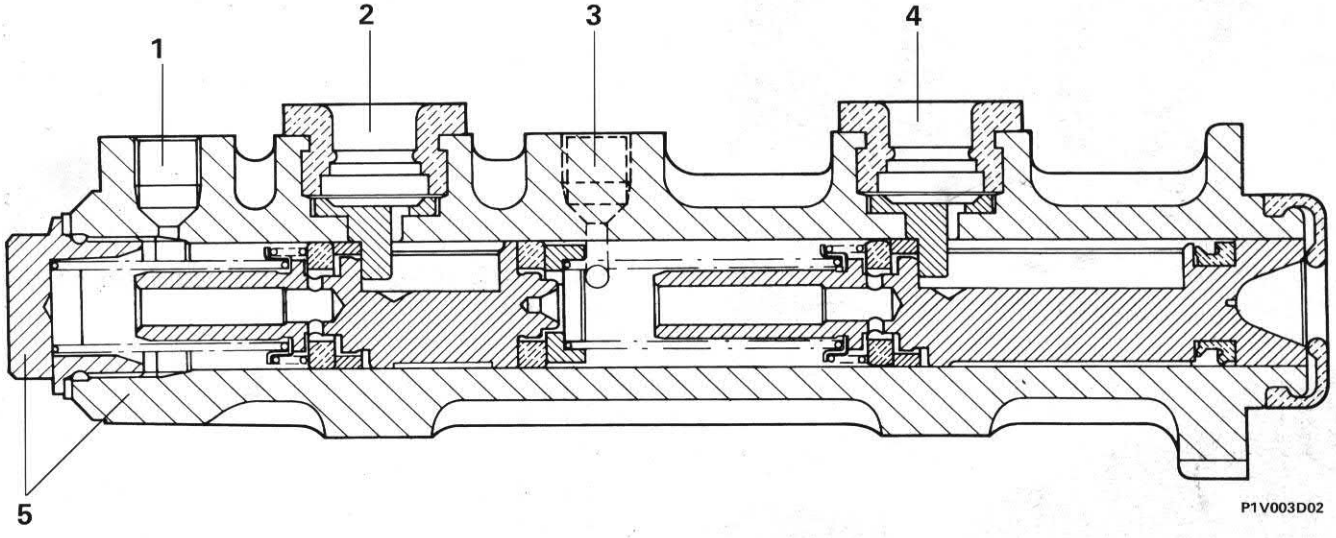
The arrows show the nuts fixing the master cylinder to the bodyshell.



Removing-refitting master cylinder

When overhauling, always replace the seals; if there are any traces of abrasion or seizing in the master cylinder casing, replace the assembly.

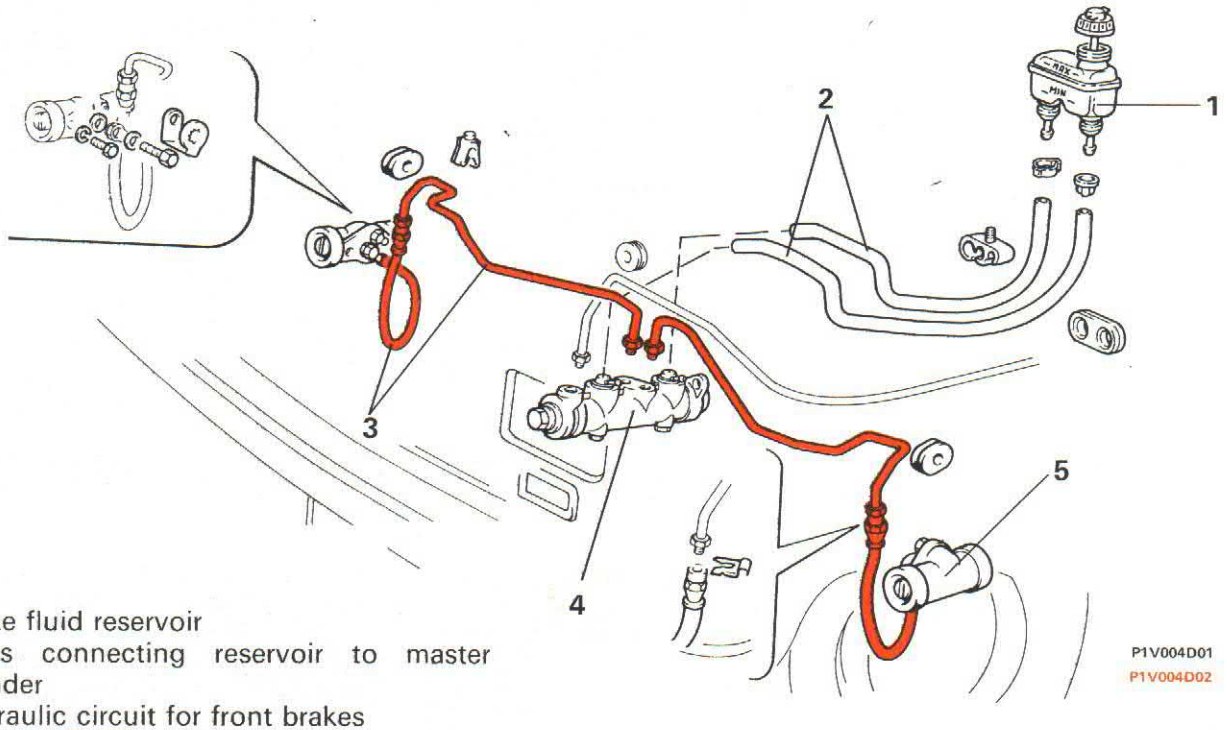
Cross section of hydraulic braking system (master cylinder)



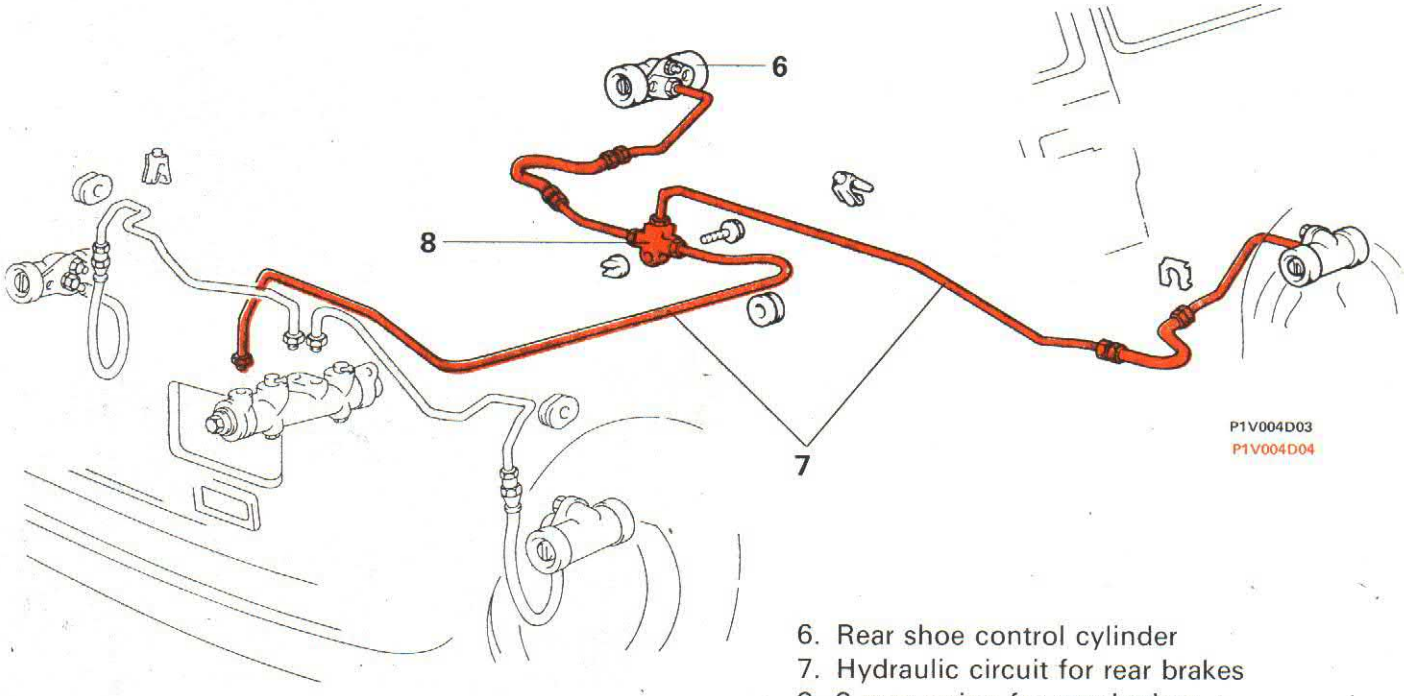
1. Rear wheel brake fluid supply pipe union seat
2. Seat for pipe union supplying brake fluid from reservoir to rear brake circuit
3. Seats for pipe unions supplying brake fluid to front wheels
4. Seat for pipe union supplying brake fluid from reservoir to front brake circuit
5. Hydraulic pump casing complete with plug

33.

Hydraulic braking system components available as spares



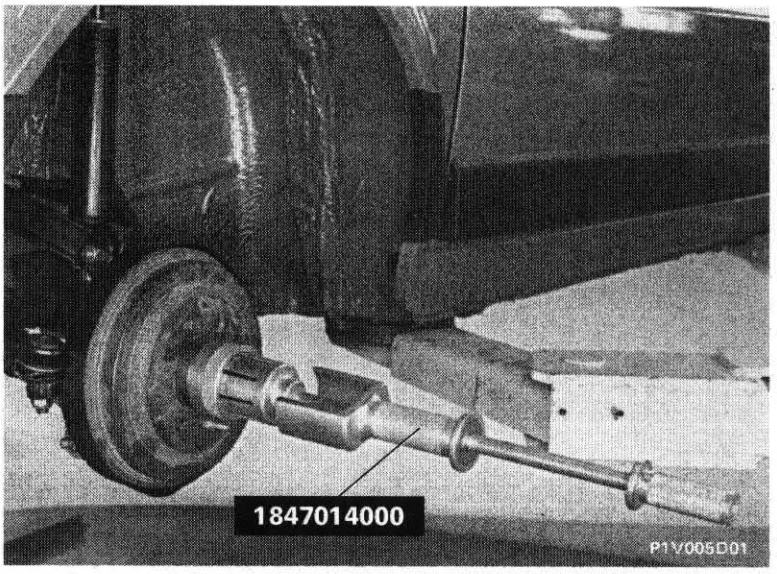
1. Brake fluid reservoir
2. Pipes connecting reservoir to master cylinder
3. Hydraulic circuit for front brakes
4. Master cylinder
5. Front shoe control cylinder



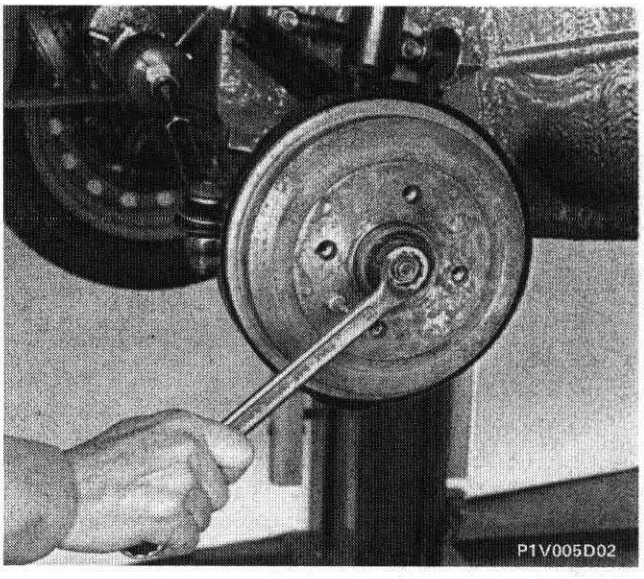
6. Rear shoe control cylinder
7. Hydraulic circuit for rear brakes
8. 3 way union for rear brakes

NOTE *Each time the pipes have to be removed check that they are not blocked by blowing through with an air jet. In the case of dents, kinks, cracks or loose unions, the pipes have to be replaced.*

REMOVING-REFITTING

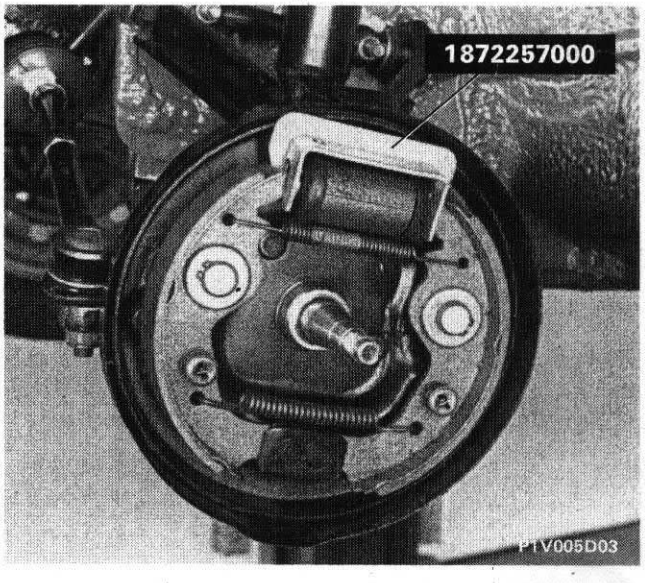


Removing front wheel hub cover



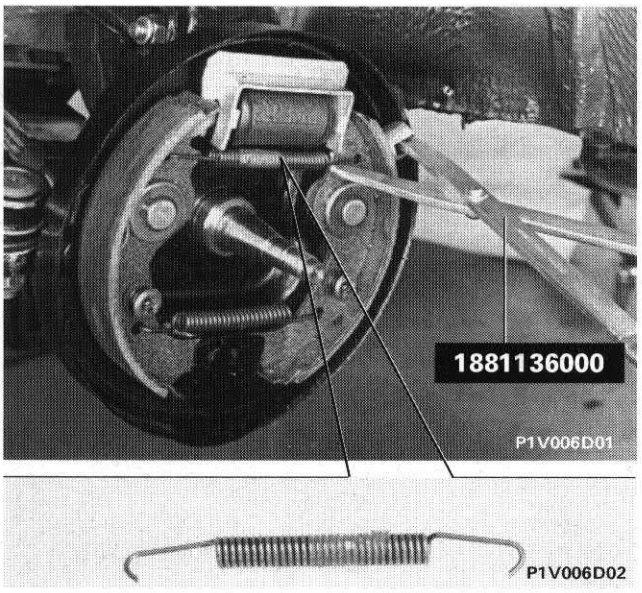
Removing front wheel hub retaining nut

Before removing the front wheel hub retaining nut, the staking have to be removed from the nut.

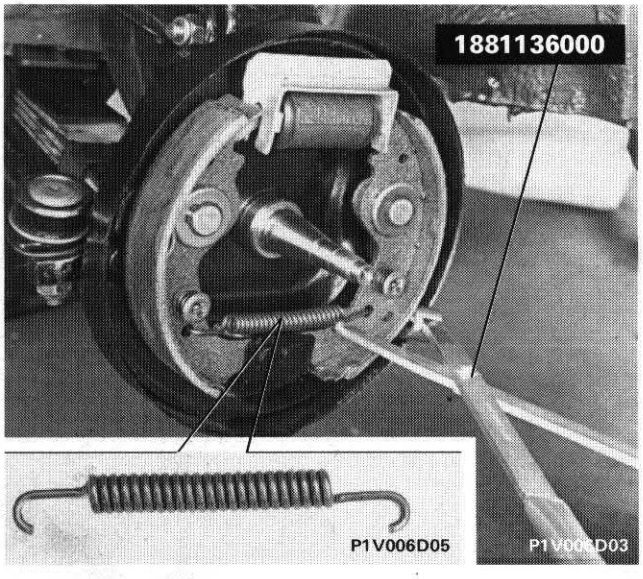


Fitting tool 1872257000 for retaining wheel cylinder piston whilst removing and refitting the shoes

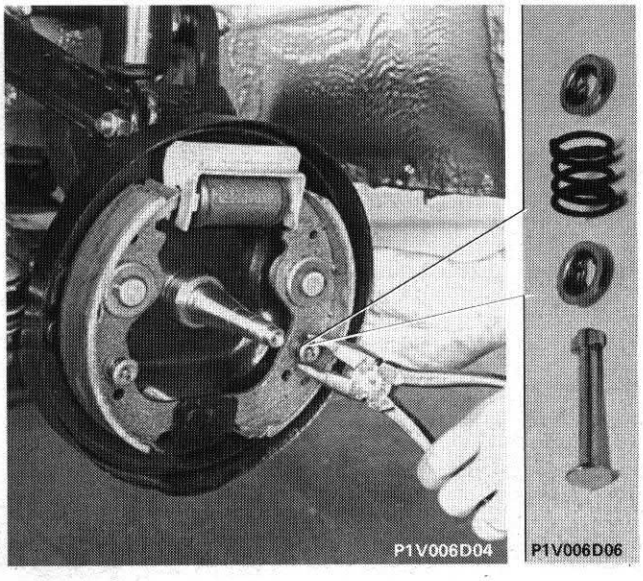
33.



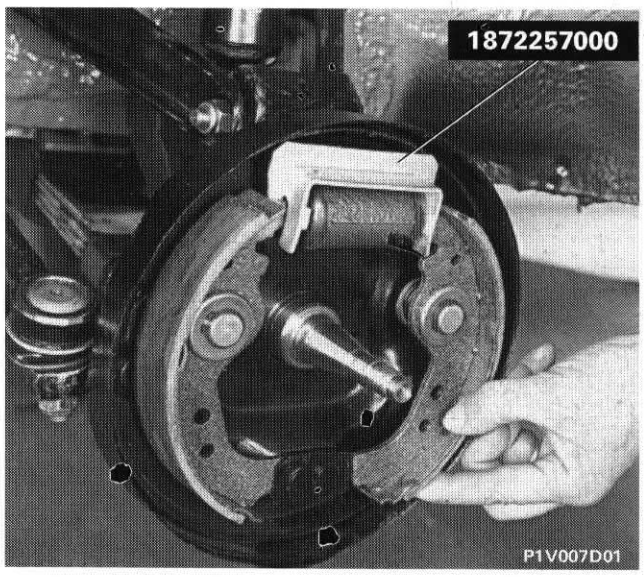
Removing-refitting brake shoe upper return spring



Removing-refitting brake shoe lower return spring

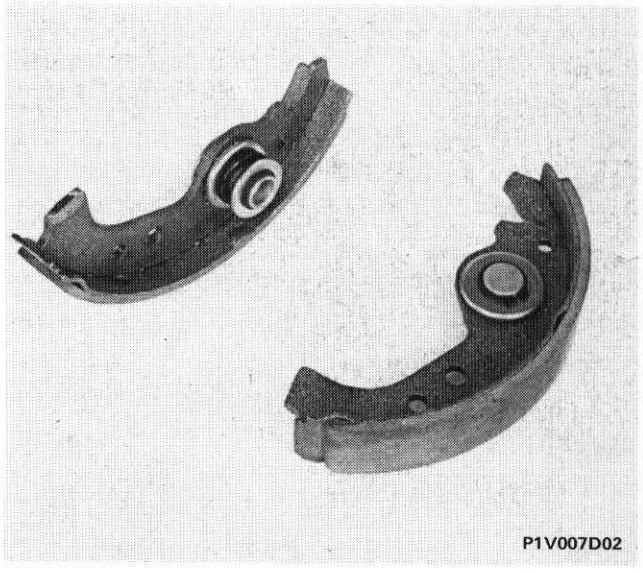


Removing-refitting brake shoe retaining pin



Removing-refitting brake shoes

SHOES

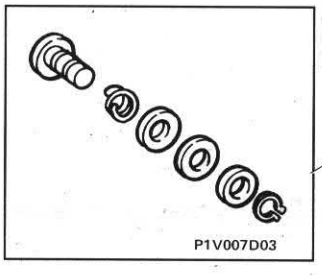


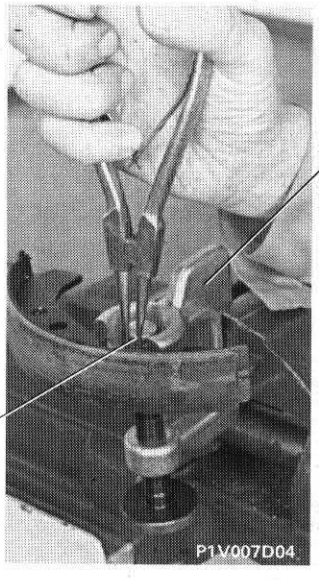
Checking shoes

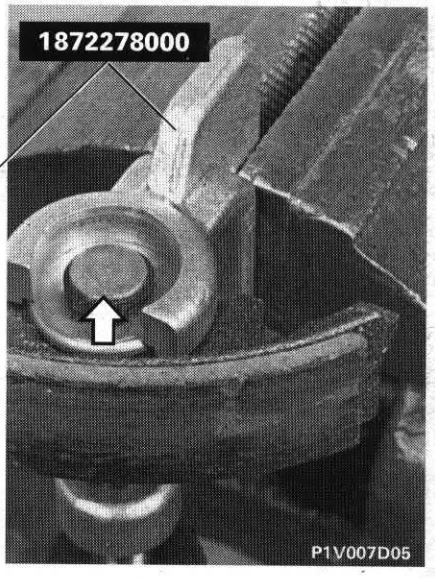
The minimum permissible thickness for brake shoes is 1.5 mm.

Removing-refitting brake shoe clearance self-adjusting device

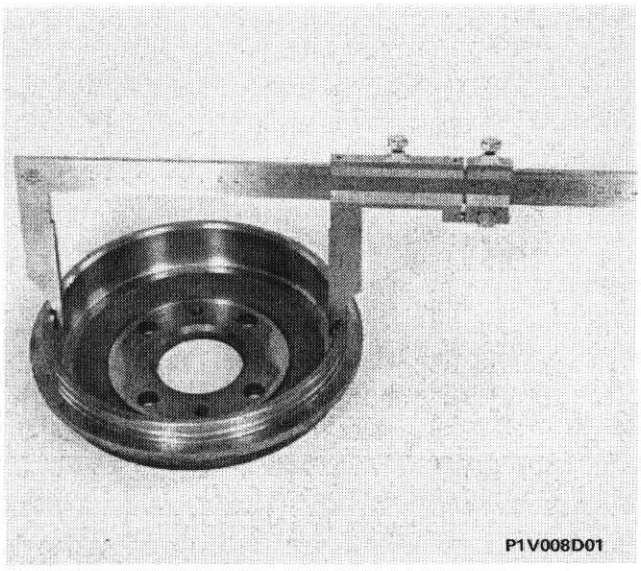
Check that self-adjusting device spring and washers are not worn or broken.
It is advisable to replace the self-adjusting device circlip.







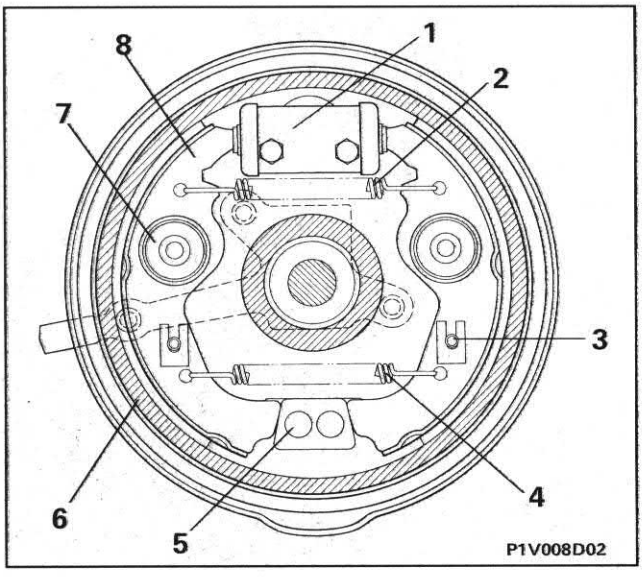
33.



BRAKE DRUMS

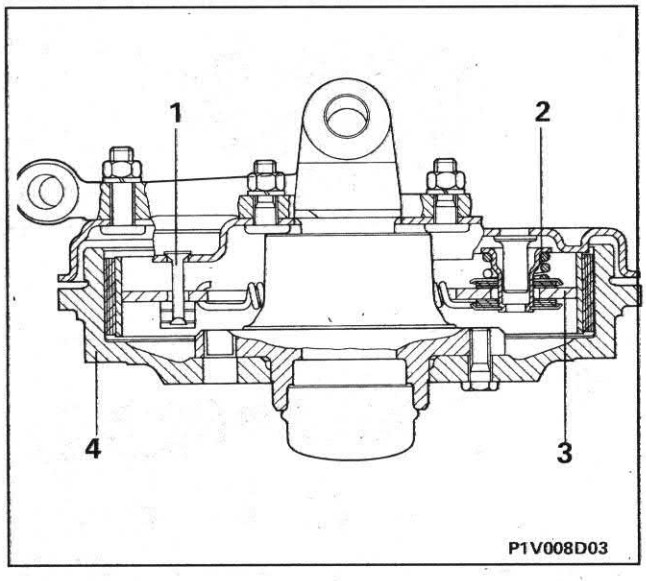
Checking and measuring brake drums

If the brake drums show signs of deep grooves or if they are unevenly worn, they must be skimmed.
The maximum permissible diameter oversize for brake drums is 0.8 mm.



Longitudinal section of front brake drum

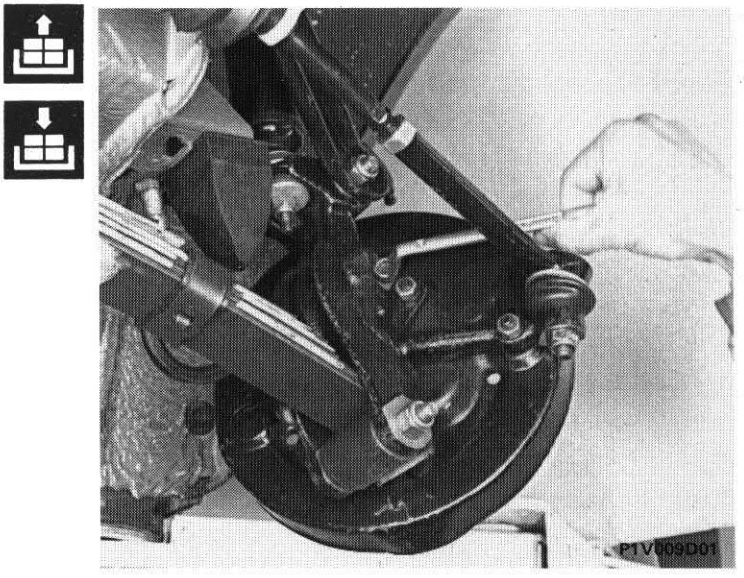
1. Wheel cylinder
2. Brake shoe upper return spring
3. Brake shoe retaining pin
4. Brake shoe lower return spring
5. Brake shoe support plate
6. Drum
7. Self-adjusting device
8. Brake shoe



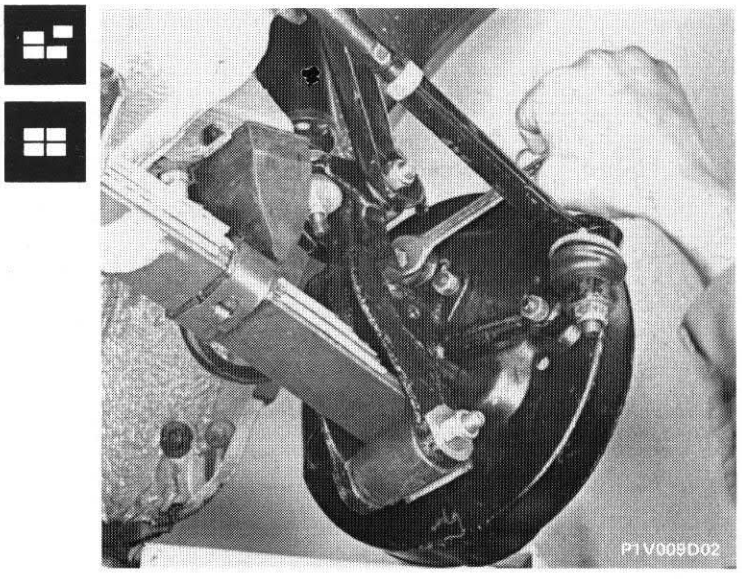
Cross section of front brake drum and self-adjusting device

1. Brake shoe retaining pin
2. Self-adjusting device
3. Brake shoes
4. Brake drum

WHEEL CYLINDER



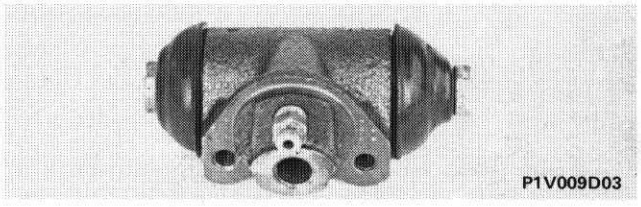
Removing-refitting bolts fixing wheel cylinder to brake back plate



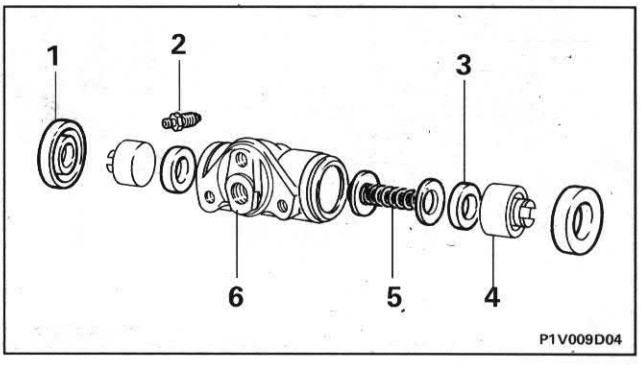
Removing-refitting brake fluid pipe from wheel cylinder

Bleeding hydraulic system

Removing-refitting and checking wheel cylinder components

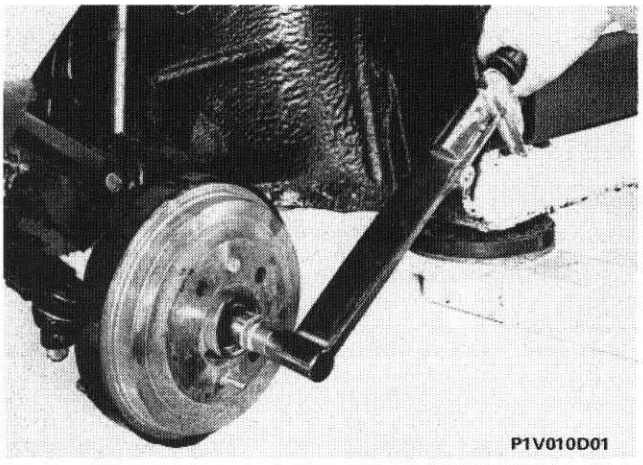


When overhauling, always replace the seals and protective boots; if there are any anomalies in the cylinder or the pistons, replace the assembly.
Make sure that the bleed screw is not obstructed.



1. Protective boot
2. Bleed screw
3. Seal
4. Piston
5. Spring and washers
6. Cylinder body

33.



0,7 daNm

ADJUSTING FRONT WHEEL HUB

In order to adjust the front wheel hub roller bearing axial clearance, the nut fixing the bearings has to be tightened to a torque of 0.7 daNm and then loosened by 30° (as shown in the diagram below).
In these conditions the axial clearance should be 0.025 - 0.100 mm.

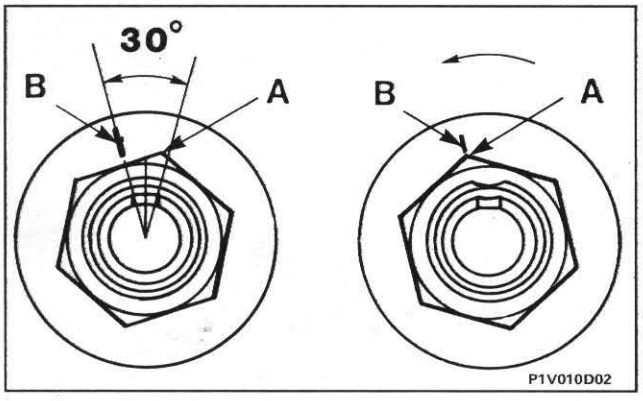
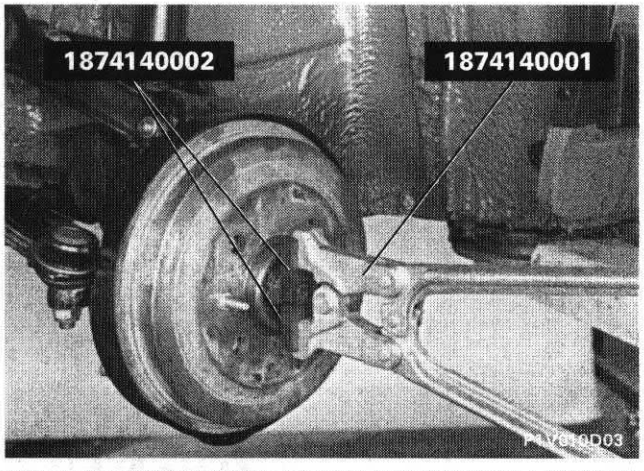
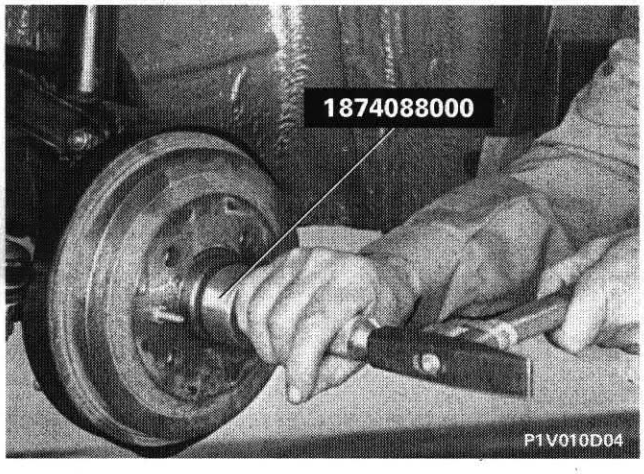


Diagram showing front wheel hub roller bearings axial clearance adjustment

A. Corner of nut after tightening to a torque of 0.7 daNm.
B. Reference mark on washer for loosening nut by 30°.



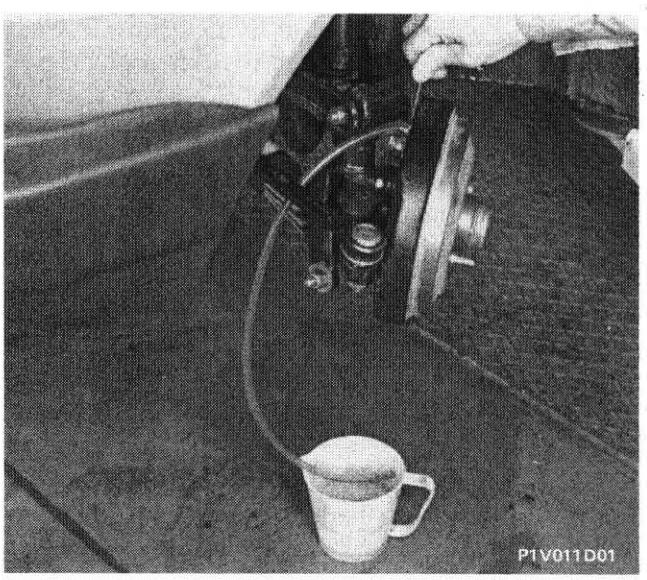
Staking nut fixing front wheel hub



Fitting front wheel hub cover

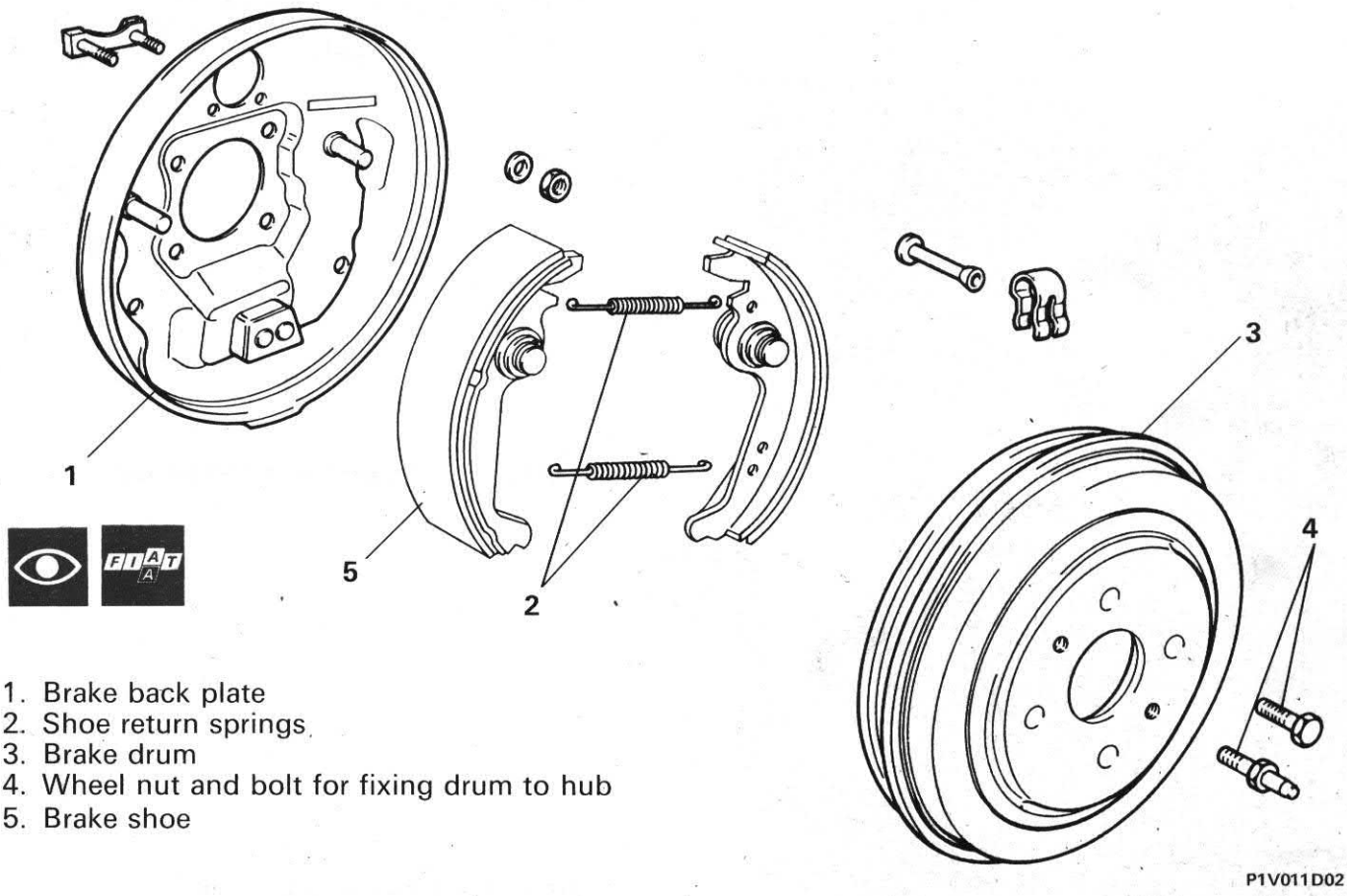
NOTE *Before fitting smear the edge of the hub cap with TUTELA MR3 grease.*

BLEEDING



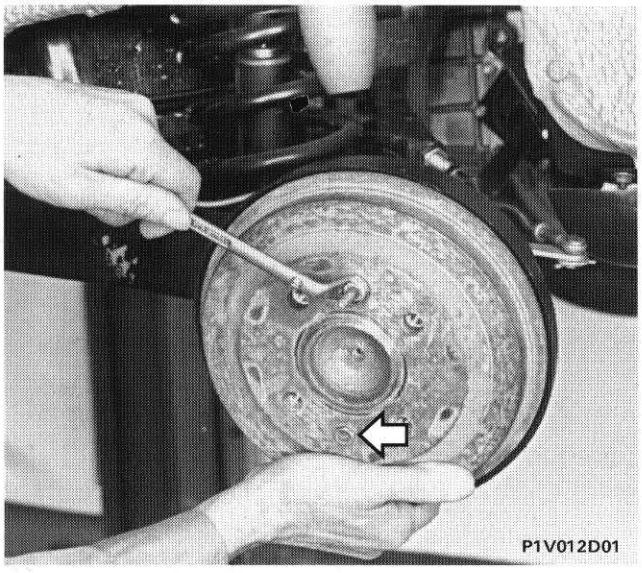
It is not advisable to reuse the brake fluid collected.
The level should be topped up with new brake fluid.

Front brake components available as spares



1. Brake back plate
2. Shoe return springs
3. Brake drum
4. Wheel nut and bolt for fixing drum to hub
5. Brake shoe

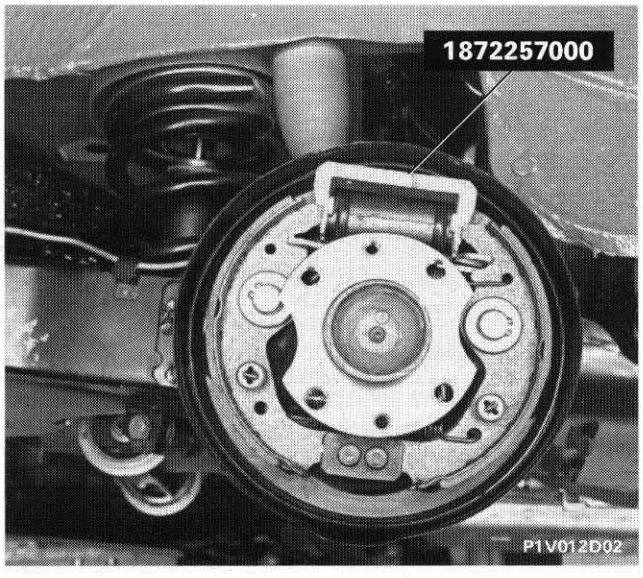
33.



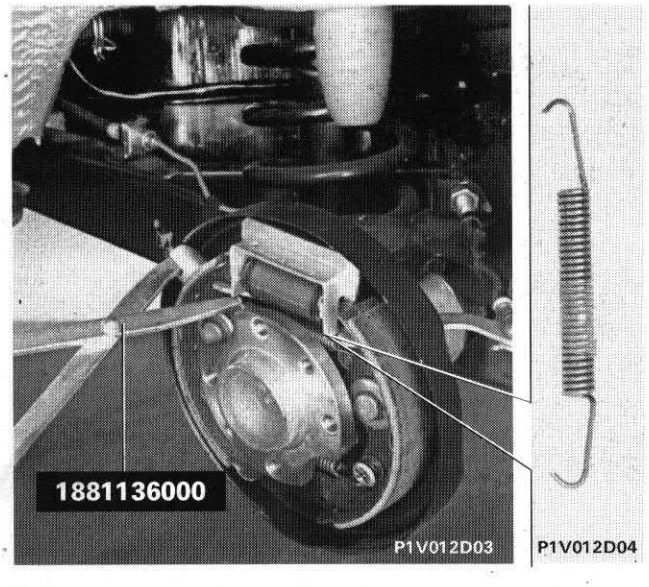
REMOVING-REFITTING

Removing-refitting brake drum

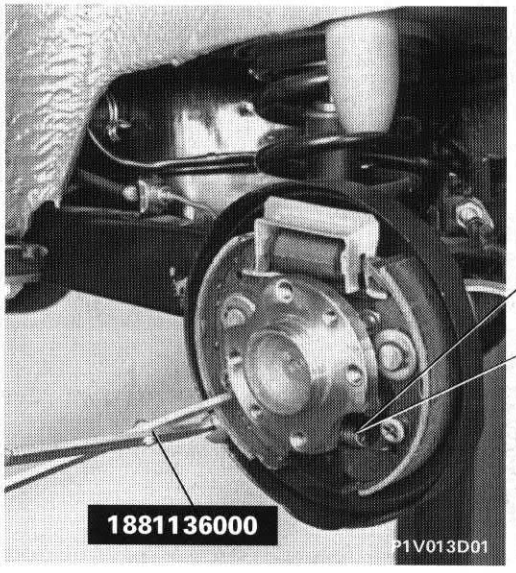
Before refitting the brake drum, remove any traces of rust from the contact surfaces



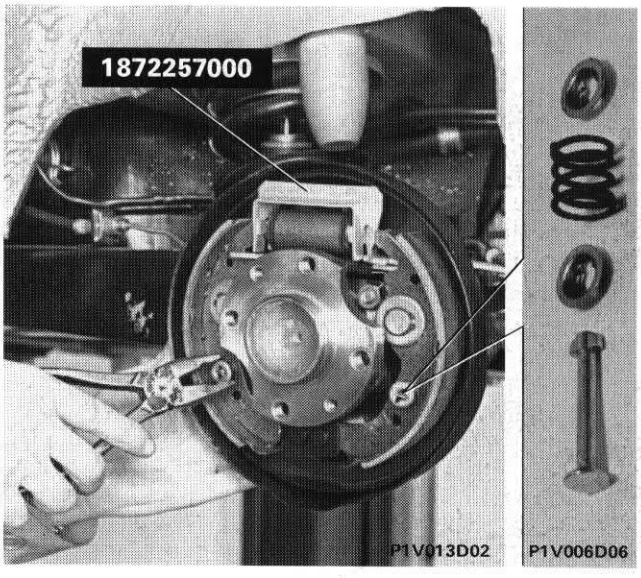
Fitting tool 1872257000 for retaining wheel cylinder piston whilst removing and refitting brake shoes



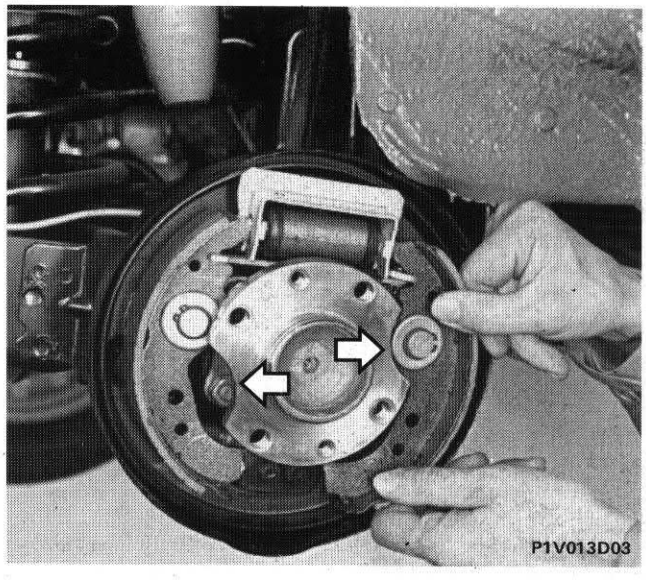
Removing-refitting brake shoe upper return spring



Removing-refitting brake shoe lower return spring



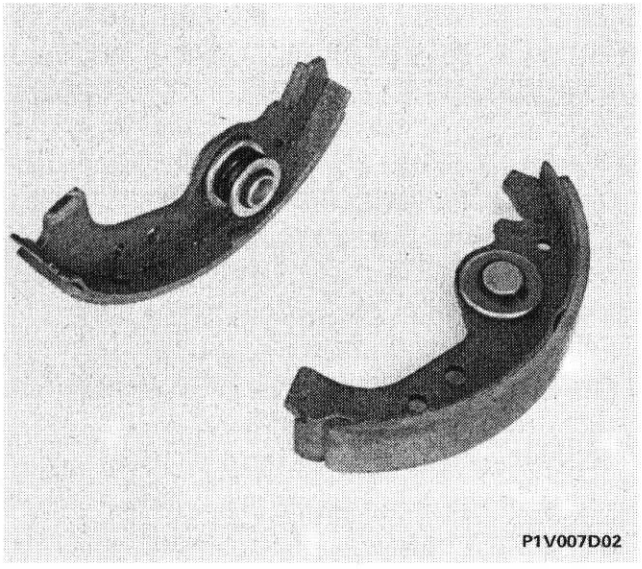
Removing-refitting brake shoe retaining pin



Removing-refitting brake shoes

The millings in the hub shown by the arrows should be facing the self-adjusting device in order to enable to the brake shoe to be removed and refitted.

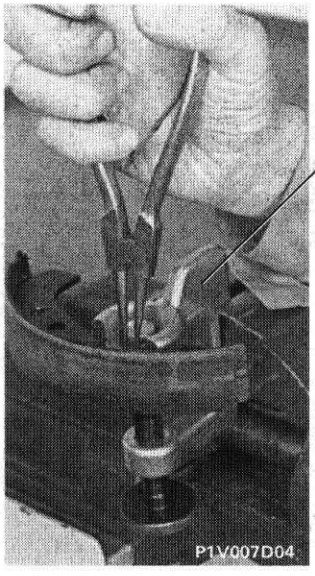
33.

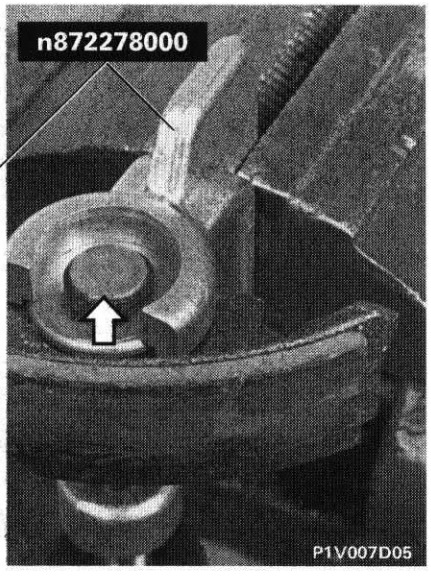


SHOES

Checking shoes

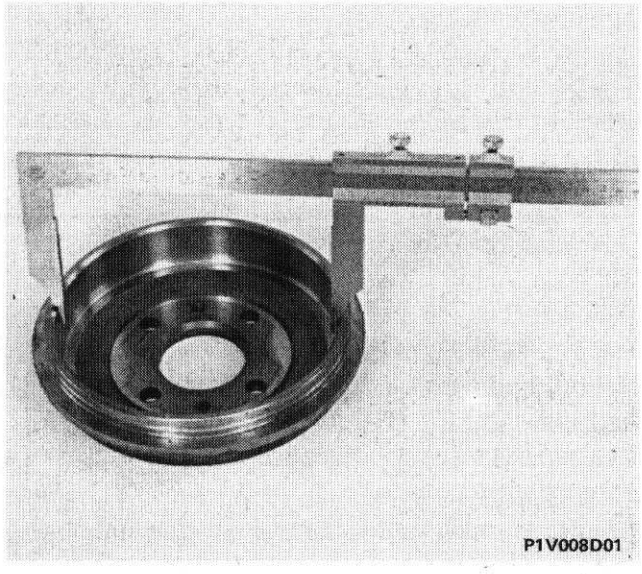
The minimum permissible thickness for brake shoes is 1.5 mm.





Removing-refitting brake shoe clearance self-adjusting device

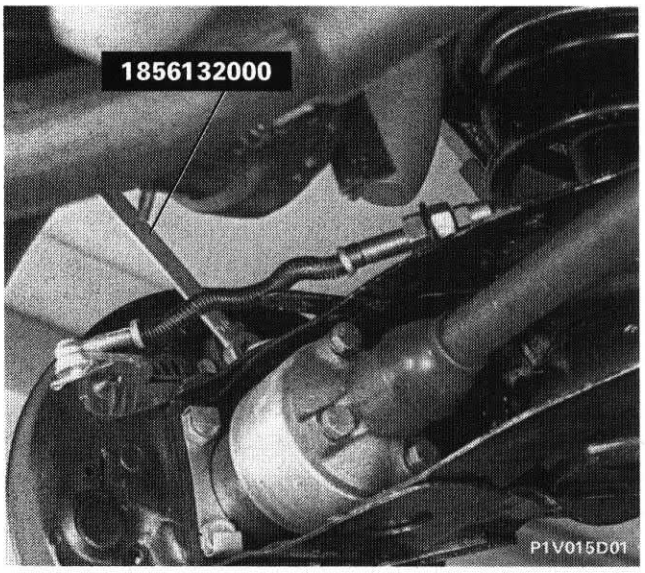
Check that the self-adjusting device spring and washers are not worn or broken.
It is always advisable to replace the self-adjusting device circlip.



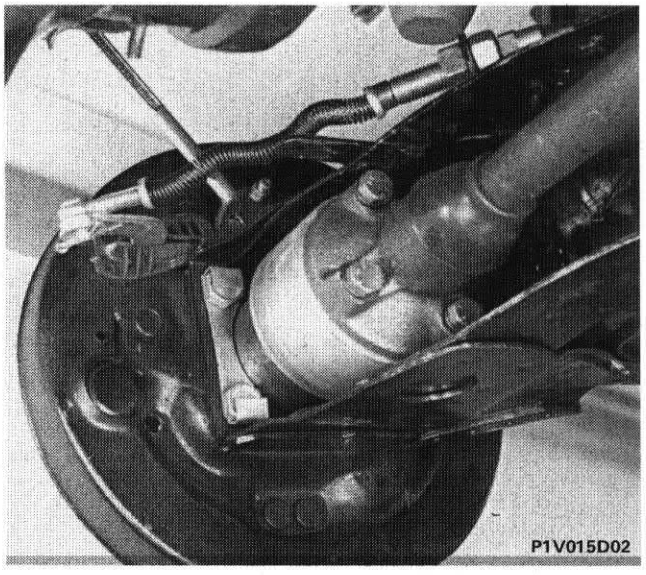
Checking and measuring brake drum

If the brake drums show signs of deep grooves or uneven wear, they should be skimmed. The maximum permissible diameter oversize for brake drums is 0.8 mm.

WHEEL CYLINDER



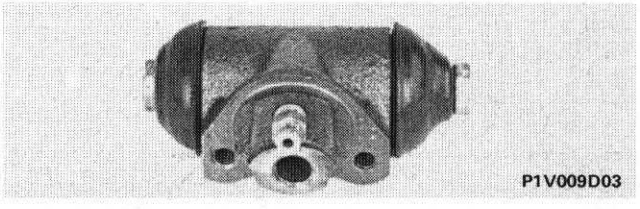
Removing-refitting brake fluid pipe from wheel cylinder



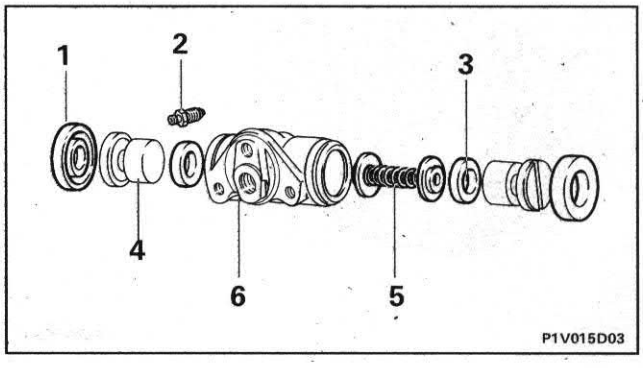
Removing-refitting bolts fixing wheel cylinder to brake back plate

Bleeding hydraulic system

Removing-refitting and checking wheel cylinder components



When overhauling the seals and protective boots should always be replaced; if there are any anomalies in the cylinder body or the pistons, replace the assembly.
Make sure that the bleed screw is not blocked.

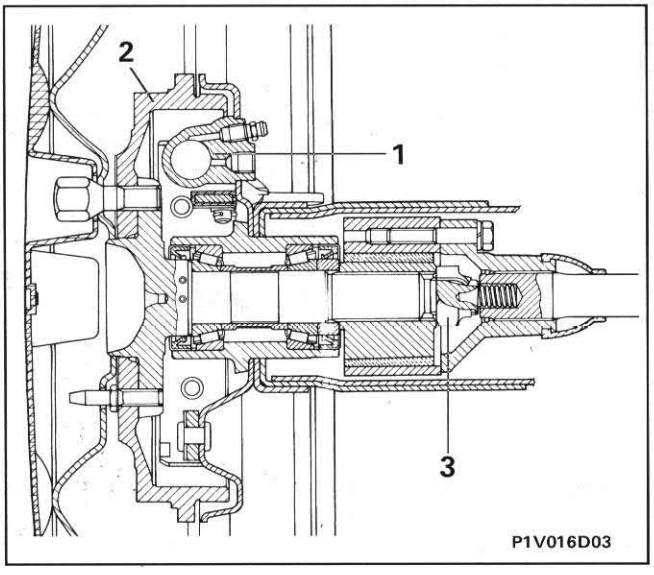


1. Protective boot
2. Bleed screw
3. Seal
4. Piston
5. Spring with washer
6. Cylinder body

33.

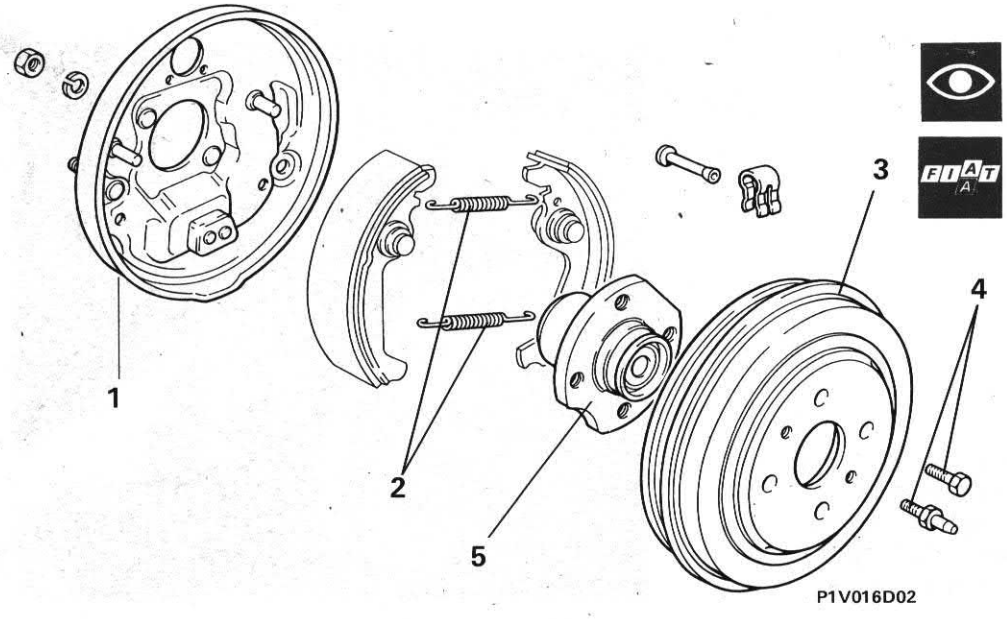
BLEEDING

It is not advisable to reuse the brake fluid collected.
The level should be topped up with new brake fluid.



Cross section of rear wheel hub and brake drum

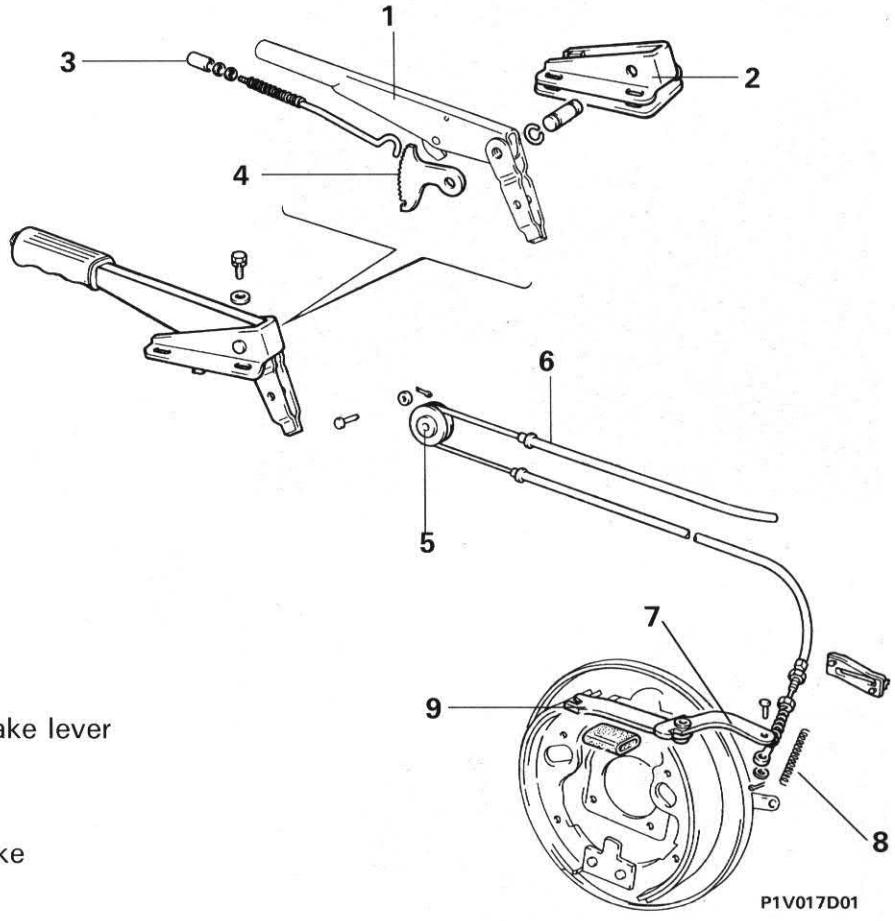
1. Wheel cylinder
2. Rear brake drum
3. Nut fixing flexible mounting and hub to wheel shaft



Rear brake components available as spares

1. Brake back plate
2. Brake shoe return spring
3. Brake drum
4. Wheel nut and bolts for fixing drum
5. Rear wheel hub

HANDBRAKE



Handbrake components

1. Handbrake lever
2. Lever mounting
3. Push button for releasing handbrake lever
4. Toothed sector
5. Cable pulley
6. Cable outer casing
7. Shoe activating lever for handbrake
8. Cable return spring
9. Shoe activating lever pin

Check the operation of each component and check that the cable slides in its casing. If there are any signs of wear or hardening, replace the affected components.

Handbrakr adjustment

From the rest position, pull the handbrake lever upwards through three notches.
Adjust both tighteners until the rear wheels are locked; then, using spanner 1856109000, lock the tighteners using the lock nuts.

33.

Checking handbrake adjustment

NOTE *When the adjustment has been carried out the handbrake lever should not go through more than 4 or 5 notches in the toothed sector and in the rest position the wheels should turn freely.*
The arrow shows the handbrake warning light on.

Special tools

33.A

1856109000 Spanner (19mm) for adjusting handbrake control
1856132000 Spanner (10-11 mm) for adjusting brake fluid pipe unions
1872257000 Set of tools for retaining wheel cylinder pistons whilst fitting brake shoes
1881136000 Pliers for removing and refitting front and rear brake shoe return springs
1872278000 Tool for removing and refitting brake shoe clearance self-adjusting device

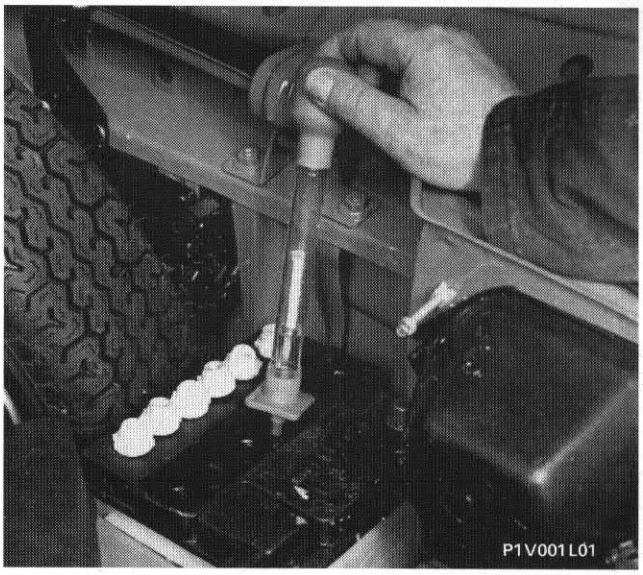
DESCRIPTION	Thread size	Tightening torque
		daNm
Front brake back plate to steering knuckle fixing, nut	M 8	2,9
Brake and clutch pedal mounting fixing, nut	M 8	1,5
Brake pump fixing, nut	M 8	1,5
Flexible pipe union on cylinder	M 10 x 1,25	2
Wheel cylinder (front and rear) to brake back plate fixing, bolt	M 6	1
Rear wheel brake back plate and hub to track control arm fixing, nut	M 10 x 1,25	5,6
Rear wheel brake drum fixing, bolt	M 12 x 1,5	8,4
Handbrake mounting fixing, bolt	M 8	1,5

BATTERY

The specific gravity of the electrolyte (see table below) is dependent on the battery's state of charge.

Baumé degrees	s.g.	Battery charge:
32	1.28	100%
29	1.25	75%
26	1.22	50%
23	1.19	25%
20	1.16	nearly discharged
15	1.11	discharged

Measurements taken at a temperature of 15°C.



Measuring battery charge using a hydrometer

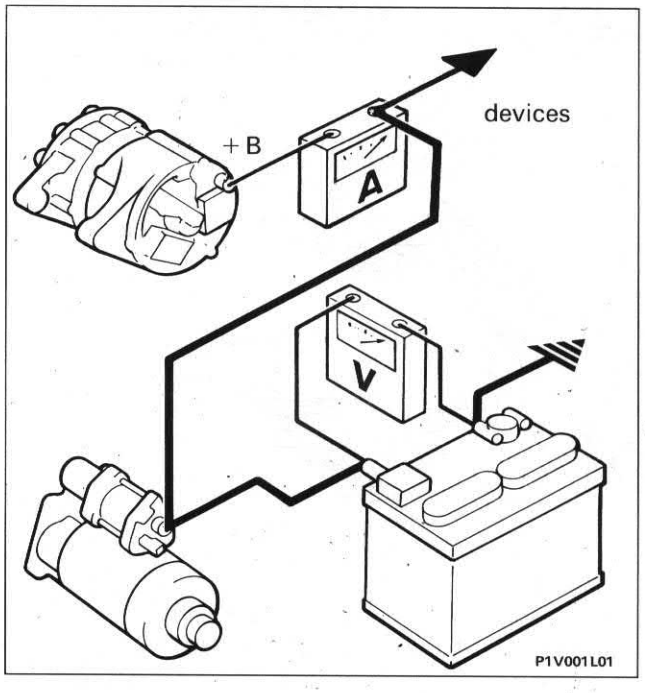
If the electrolyte level in one or more battery cells is below the minimum mark on the plastic container, top up with de-ionized distilled water.

ALTERNATOR

Checking maximum current output from alternator with integral electronic regulator, in the car:

Proceed as follows:
- disconnect the lead from the + B terminal of the alternator;
- insert an ammeter between this lead and the alternator's + B terminal;
- connect a voltmeter between the battery's negative pole and the lead connected to the alternator and ammeter (see diagram);
- start the engine and increase the speed to 3000 - 3500 rpm;
- switch on all available electrical devices one by one;
- measure the maximum current output when the voltage reading falls below 13.5 V.

If the ammeter's current reading is more than 5 A below the specified value, overhaul the alternator.



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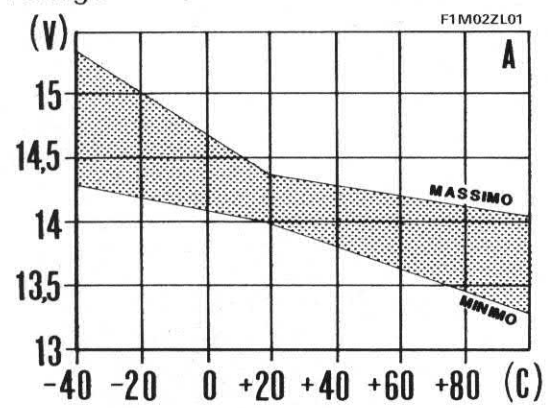


Ambient temperature of electronic regulator

Checking regulated voltage supplied by alternator, in the car

Maintain the connections and engine speed as stated above, then switch off a few devices until an absorption of approximately **half the maximum load** (20-25 A) is obtained.
Under these conditions, the voltage reading must be within the maximum and minimum values shown on the graph opposite, depending on the ambient temperature of the electronic regulator (alternator).

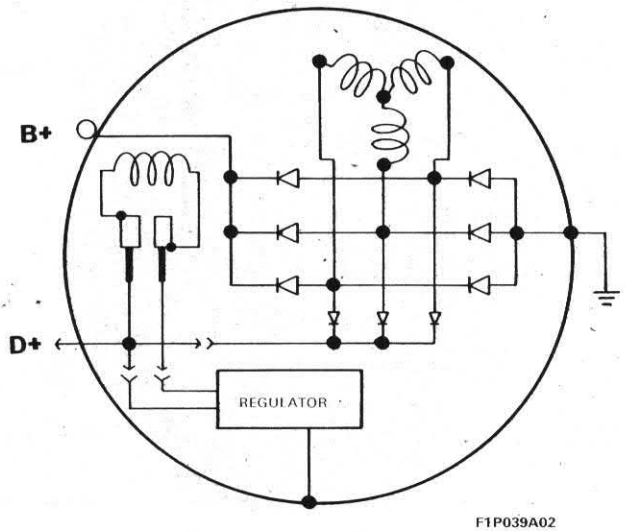
NOTE *With the alternator warmed up in an 80°C environment, the regulated voltage must reach 13.5 - 14.2 V.*

Checking regulation stability of electronic regulator

Maintain the same electrical connections and engine speed and switch on a few devices until a current absorption equivalent to 2/3 of the alternator's maximum output is obtained.
Under these conditions, the voltage must not drop by more than 0.4 V.
Then switch off a few devices until a current absorption of approximately 5 A is obtained; the voltage must not differ by more than ± 0.2 V from the reading taken at approximately half load.
If the voltage variation is not within the specified tolerance limits, the electronic voltage regulator is faulty and must be replaced.

Removing/refitting alternator

Proceed as follows:
- disconnect the battery's negative terminal and the alternator lead;
- slacken the alternator's bottom mounting bolt;
- slacken the alternator's top bracket bolt;
- manoeuvre the alternator to free it from the belt;
- remove the slackened bolts and withdraw the alternator from the engine compartment.



Wiring diagram

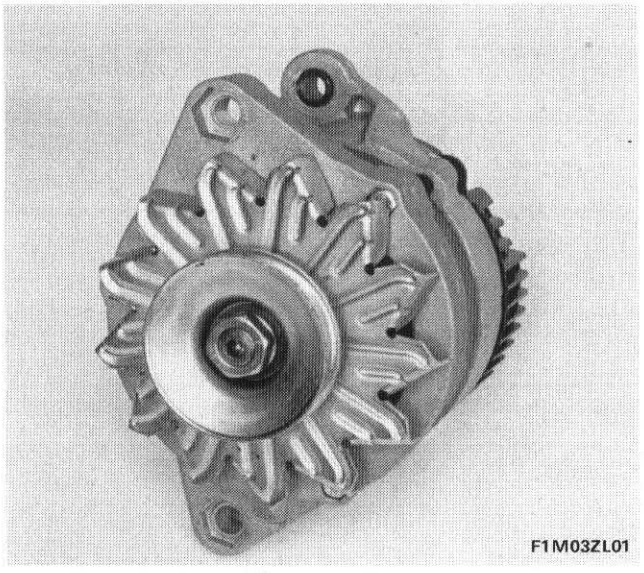
TENSIONING ALTERNATOR BELT

Slacken the alternator's bottom mounting nut.
Slacken the top tensioning bracket nut.
Insert a lever between the alternator and the engine and tension the drive belt as necessary.
Then tighten the two alternator nuts.

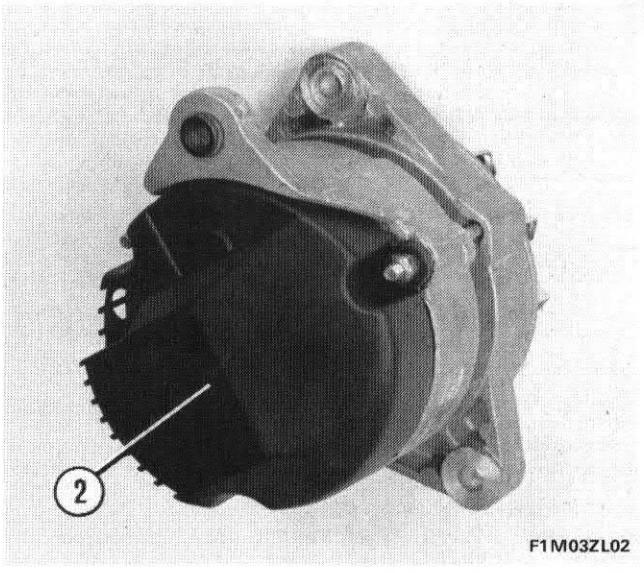
NOTE *The belt tension must be 30-40 daNm measured using tool 1895760000 or the new tool 1895762000.*

M. MARELLI ALTERNATOR OVERHAUL

Never start up the engine when there are temporary or slack electrical connections on the recharging circuit, since this could damage the alternator diodes. Never use test lamps for diagnostic checks on the electronic regulator, since it could be damaged.



M. Marelli AA125R-14V-45A alternator

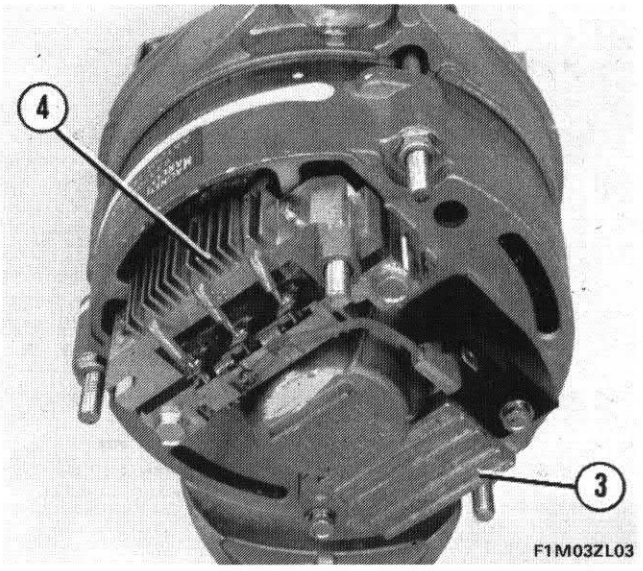


Rear view of the alternator

NOTE *M. Marelli alternators are very similar in construction. The instructions and illustrations on the following pages apply to all of them.*

Unscrew the nuts securing the rear cover (2) to the alternator and remove the rear cover.

Before fully dismantling the alternator, carry out the operations and checks described below.



View of the alternator with rear cover removed

3. RTT 119A electronic voltage regulator.
4. 9-diode rectifier bridge.

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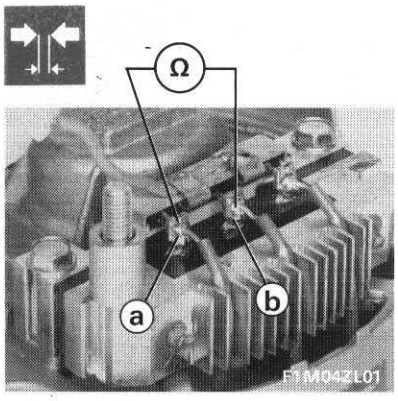
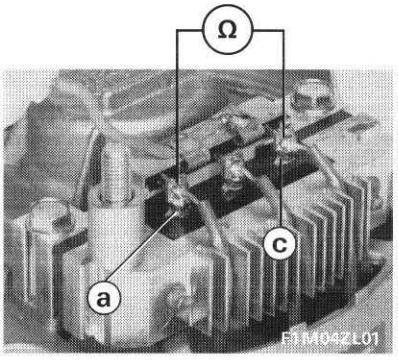
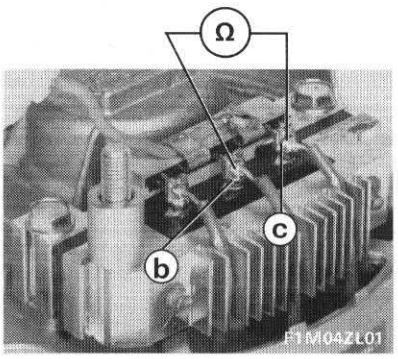


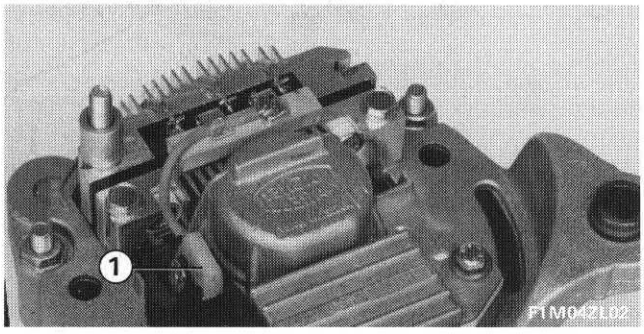




Checking continuity of the 3 stator windings

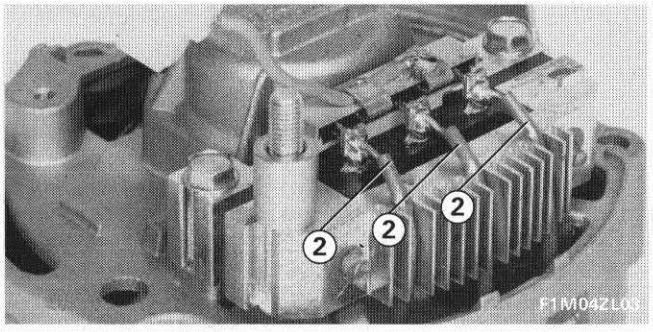
Connect the leads of an ohmmeter (set to a 1 Ω scale) to the ends of the three stator phases (a-b-c) in the three possible configurations as illustrated.
The resistance readings given by the instrument must be the same for all three measurements.

If the instrument needle does not move (infinite resistance) or reaches the end of the scale (no resistance), this means that the phase being measured is broken or in short circuit, in which case the stator must be renewed.

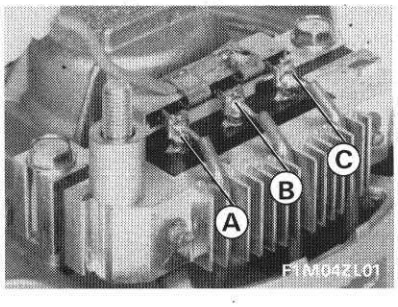


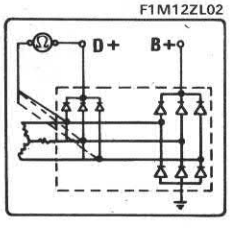
CHECKING DIODES

Disconnect the excited diode wiring connector (1) from the positive brush spade connector.



Unsolder the terminals (2) of the stator windings from the rectifier bridge.



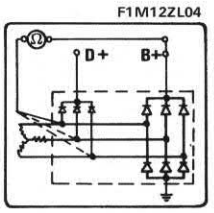


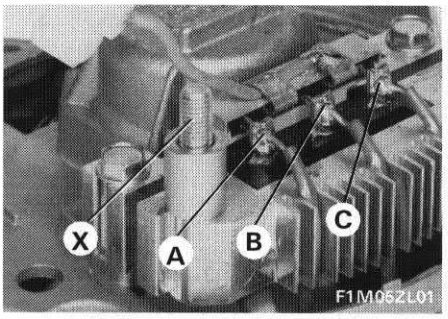
Checking exciting diodes

Connect an ohmmeter lead to connector (1).
The instrument's second lead should be placed in contact with each of the three terminals (A-B-C) in turn.
Reverse the instrument's lead connections and repeat the three measurements.

Checking positive power diodes

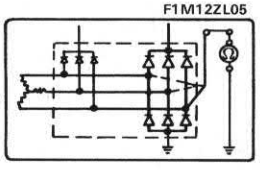
Connect an ohmmeter between the alternator's positive terminal (X) and each of the three terminals (A-B-C) in turn.
Reverse the instrument's lead connections and repeat the three measurements.

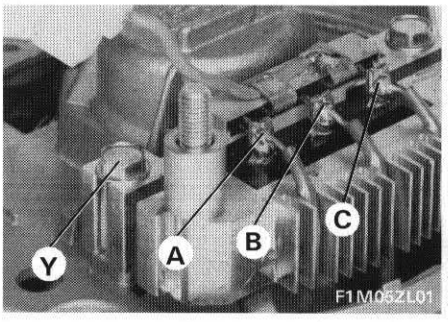




Checking negative power diodes

Connect an ohmmeter between the negative diode assembly (Y) and each of the three terminals (A-B-C) in turn.
Reverse the instruments lead connections and repeat the three measurements.



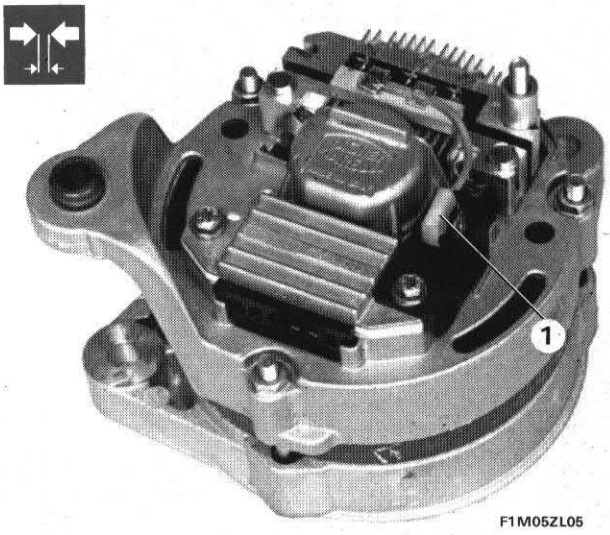


The instrument should give a resistance reading for each of the terminals (A-B-C) in the tests described above.
When the instrument's leads are reversed, the pointer should not move. If the pointer moves for both connection configurations (diodes in short circuit), or does not move at all (broken diode), the complete rectifier bridge should be renewed.

ROTOR

Checking rotor resistance measured between the brush spade connectors

Disconnect the excited diode wiring connector (1) from the positive brush spade connector.
Connect an ohmmeter (set to a 1 Ω scale) between the two spade contacts on the brush holder/voltage regulator support.
If the resistance reading given by the instrument is different from that specified, or is infinite (broken circuit), the rotor will need to be checked and possibly renewed.



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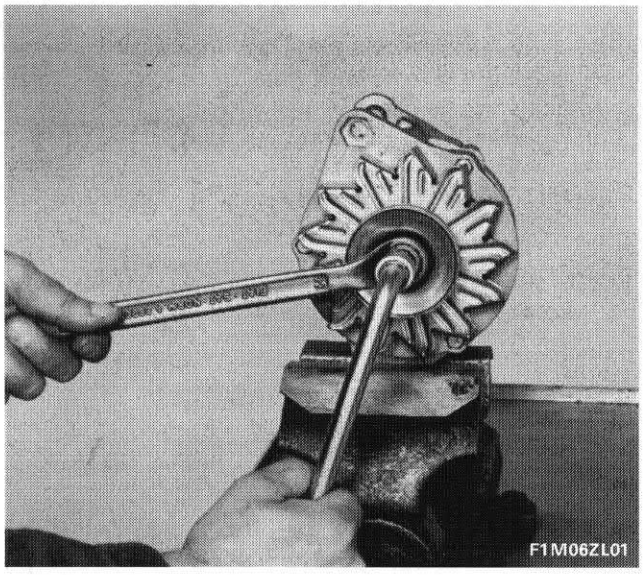
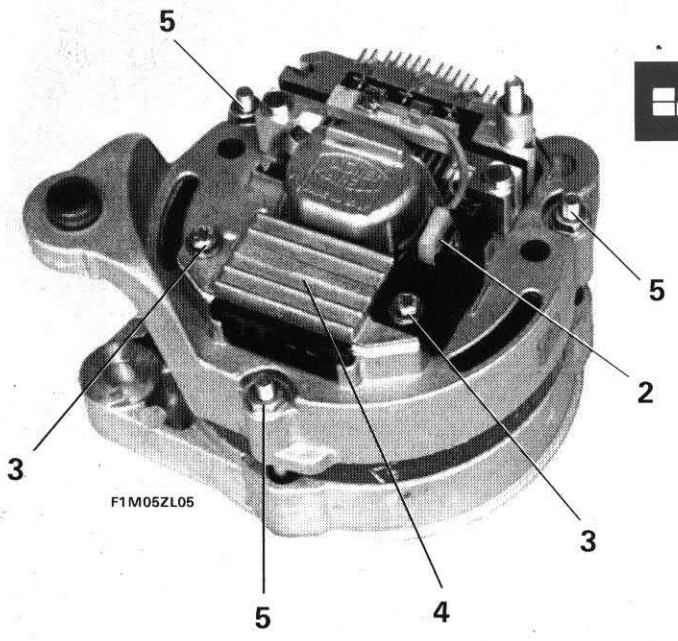
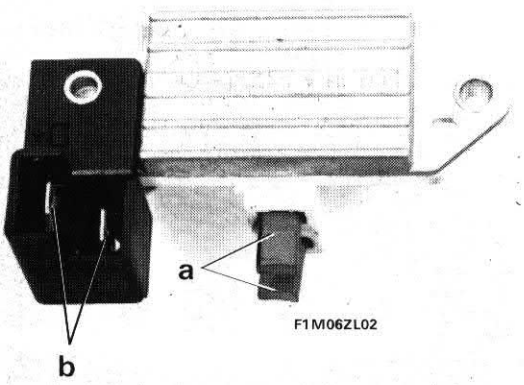


Dismantling

Whilst holding the alternator shaft still with a suitable Allen key, unscrew the nut securing the fan and pulley to the rotor.
Slide the fan, pulley, spacers and washers off the alternator shaft.



Disconnect the excited diode wiring connector (2) from the positive brush spade connector.
Unscrew the bolts (3) securing the electronic voltage regulator (4) complete with brushes to the alternator rear end plate.
Unscrew the nuts (5) and remove the bolts holding the alternator's main external components.

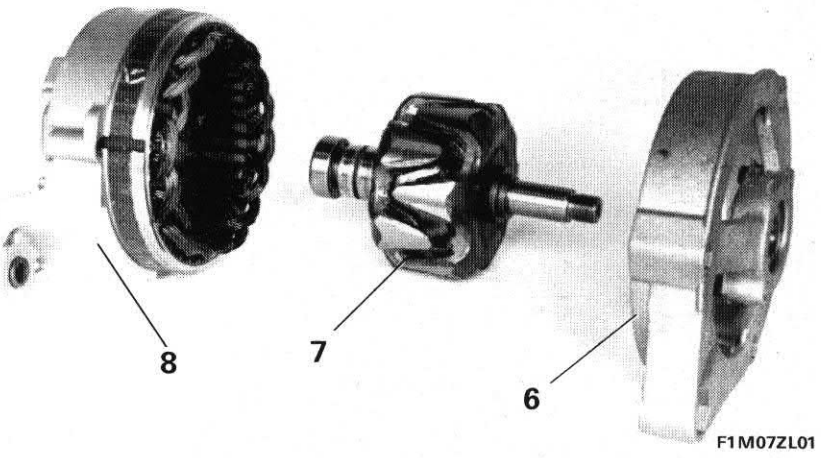


Electronic voltage regulator

a. Brushes
b. Spade connectors

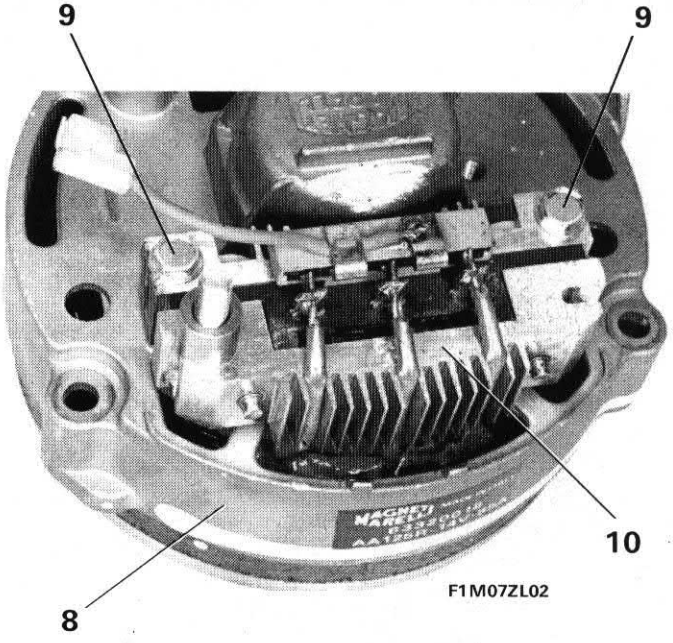
Dismantle the various components (as illustrated), remembering that some pressure must be exerted on the rotor shaft to free the rotor (7) from the front mounting plate (6).

NOTE *If a press is not available, use a brass drift to avoid damaging the thread.*

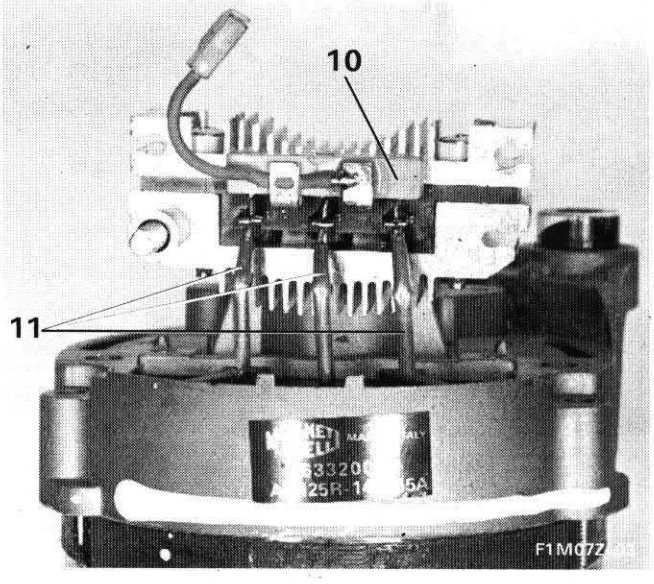


Unscrew the bolts (9) securing the rectifier bridge (10) to the rear mounting plate (8).

The rectifier bridge must not be dismantled; it is supplied as a complete assembly.



Move the rectifier bridge (10) away from the rear mounting plate and unsolder the terminals (11) of the stator windings.



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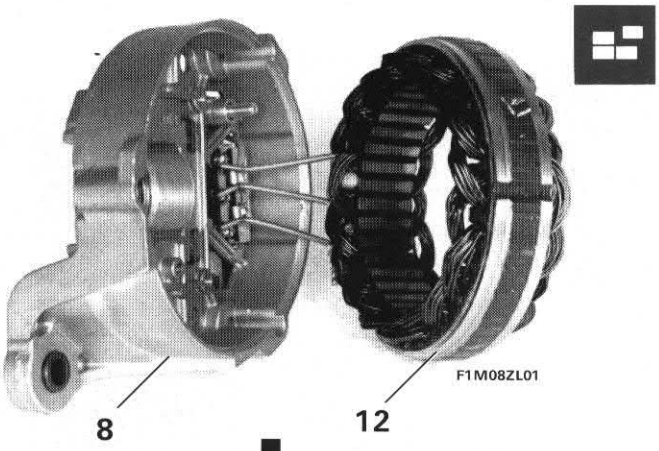
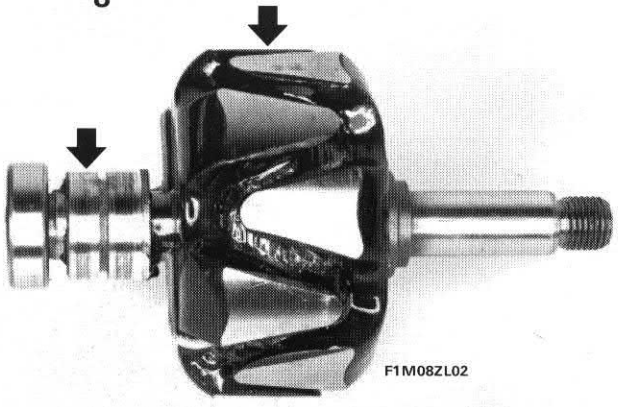
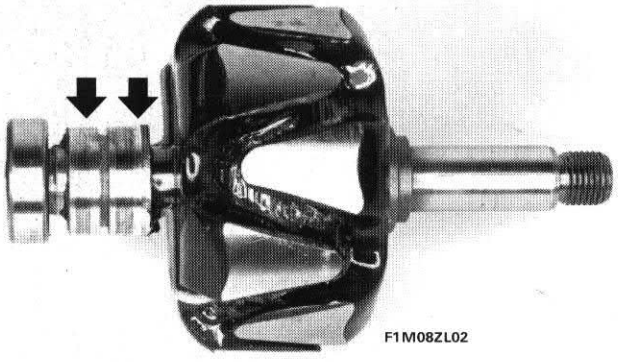


Dismantle the stator (12) and its terminals (11) from the rear mounting plate (8).



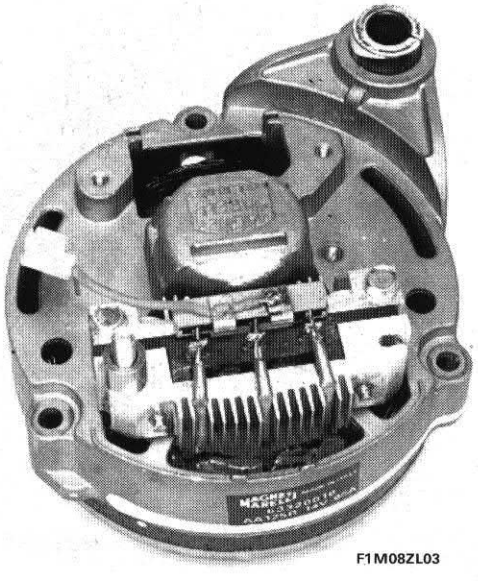
Checking rotor insulation

Connect an ohmmeter (set to a 1 Ω scale) between a slip ring and the rotor casing (see arrows).
The instrument should give an infinite resistance reading; if not, the rotor should be renewed.



Checking rotor resistance between the slip rings

Connect an ohmmeter (set to a 1 Ω scale) between the rotor's slip rings (see arrows); the instrument reading should show some resistance.
If the instrument's resistance reading is different from that specified, or is infinite (broken circuit), the rotor will have to be renewed.

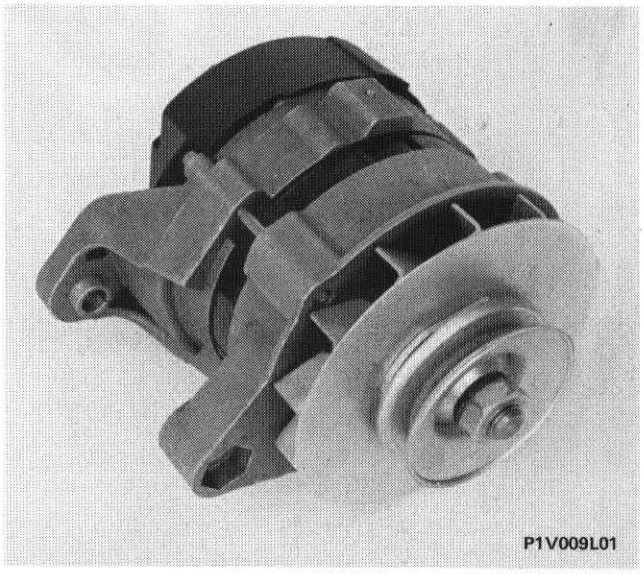


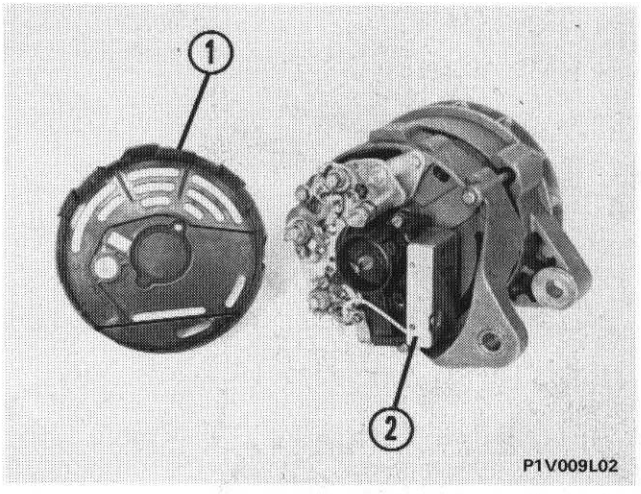
Check that the bearing moves freely and noiselessly with no tight spots. Check that there are no hollows on the slip rings caused by the brushes, otherwise the complete rotor should be renewed.

Reassembly

To reassemble, simply reverse the procedure for dismantling.

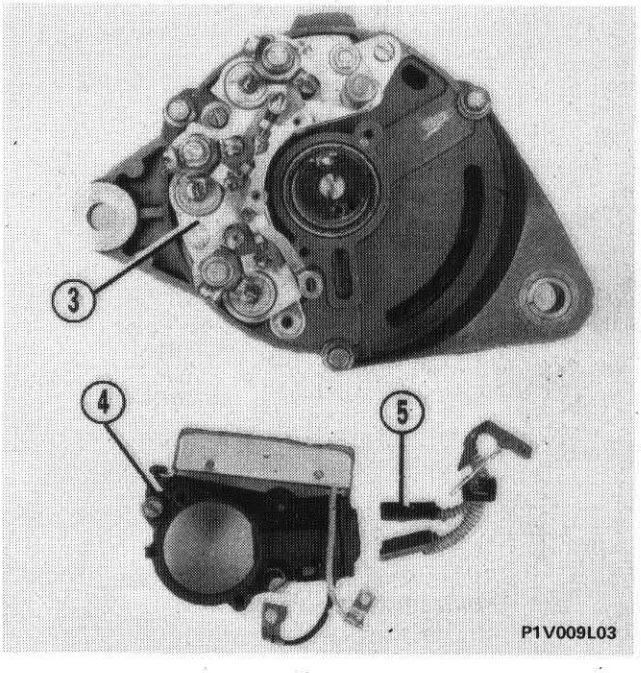
DISMANTLING Z.E.M. A 115 - 14 V - 43 A ALTERNATOR





Dismantled alternator

1. Rear cover
2. 15TR b electronic voltage regulator



Alternator (diode assembly end) and brush holder

3. Diode assembly
4. Brush holder
5. Brushes

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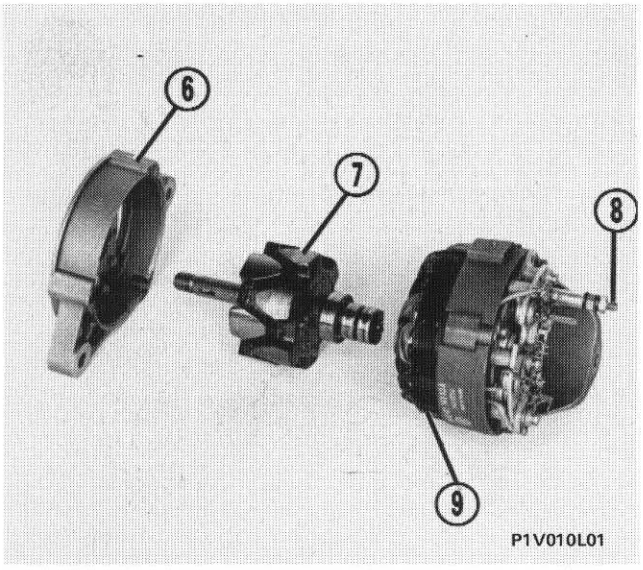
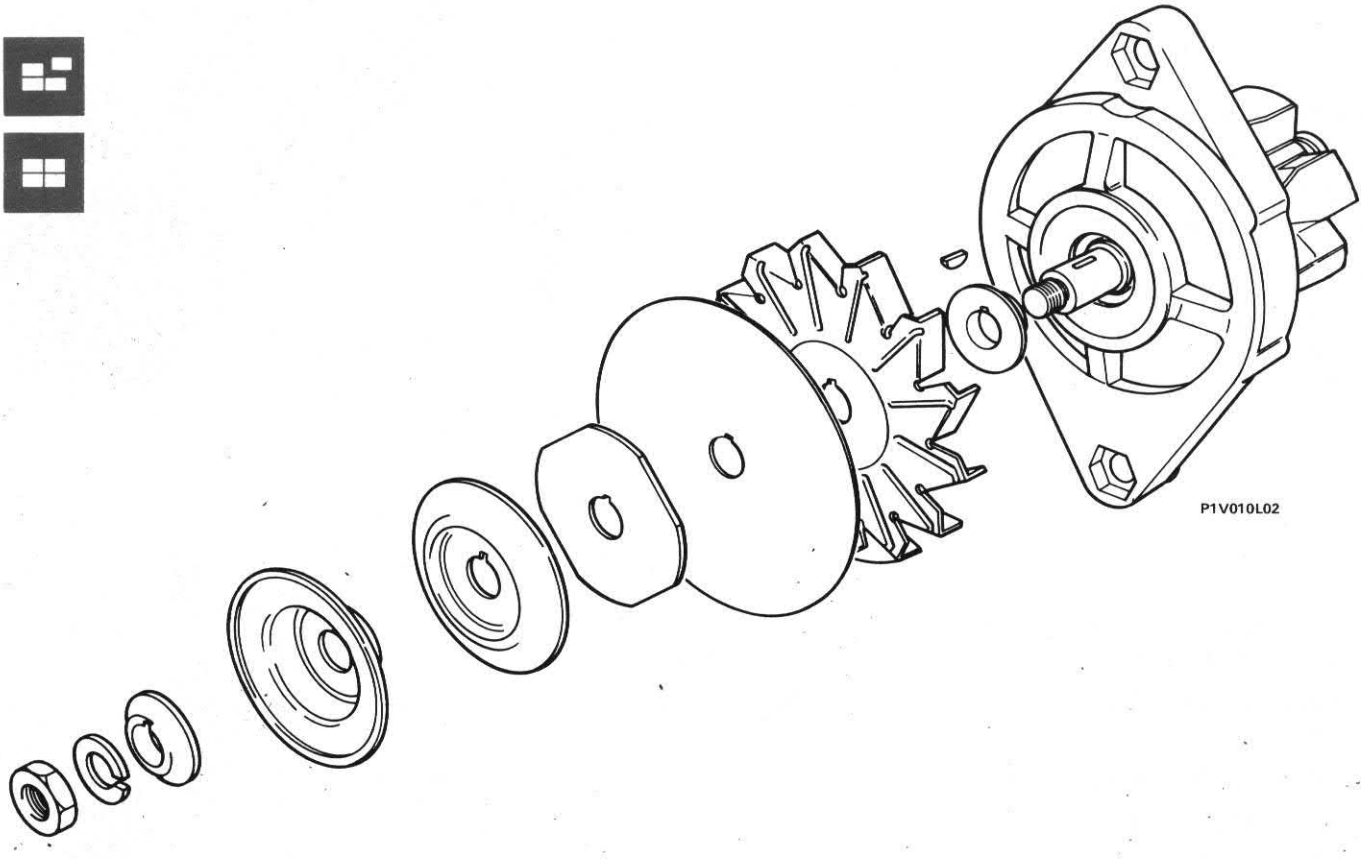


Dismantled alternator

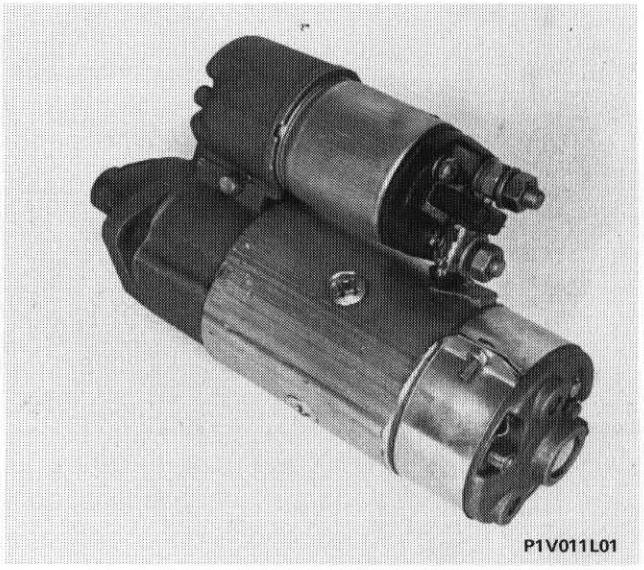
6. Alternator housing (drive end)
7. Rotor
8. Alternator terminal (+ B)
9. Stator windings

View of pulley components - Z.E.M. A 115 - 14 V - 43 A alternator

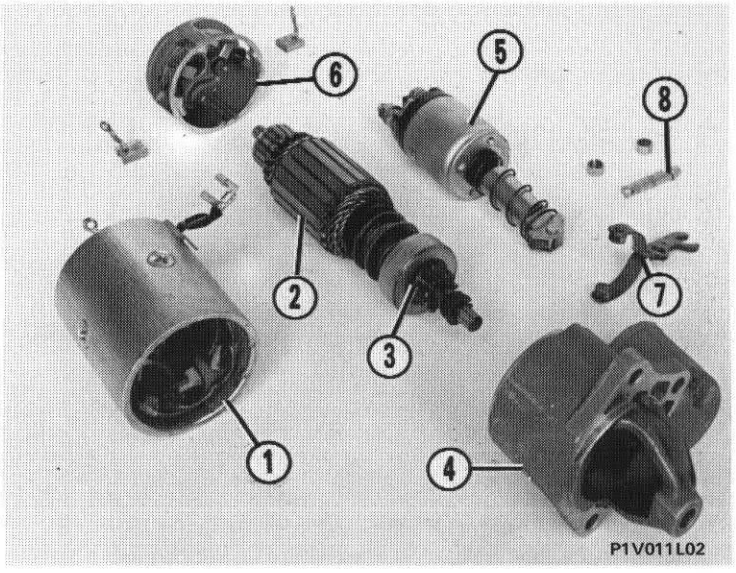


Never start the engine when there are temporary or slack electrical connections on the recharging circuit, since this could damage the alternator diodes. Never use test bulbs for diagnostic checks on the electronic regulator, since it could be damaged.

DISMANTLING Z.E.M. R 76 A 0.6 KW - 12 V STARTER MOTOR



Before overhauling the starter motor, make sure that the insufficient starting power is not caused by low battery charge.



Starter motor components

1. Field coils
2. Armature
3. Pinion and clutch assembly
4. Drive end housing
5. Solenoid
6. Commutator end housing and brush holder
7. Pinion actuating fork
8. Pin

Checks

Carry out the following tests on the starter motor components:

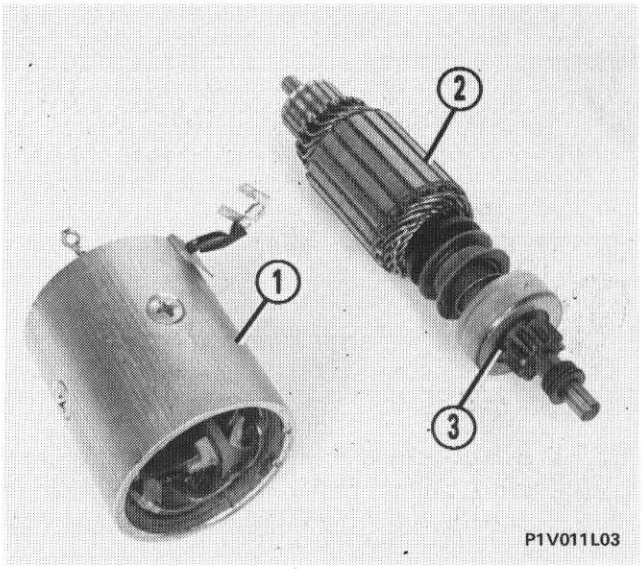
armature: continuity, short circuit and earthing

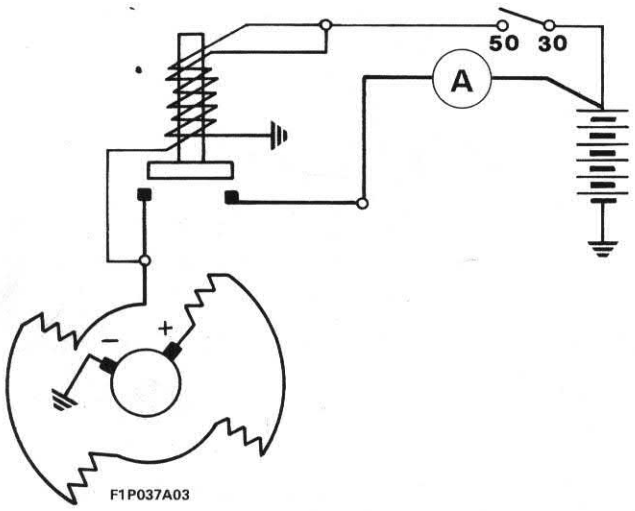
field coils: continuity and earthing

brush holder: earthing

solenoid: continuity and earthing

The pinion and clutch assembly (3) must be renewed if the starter motor engages noisily during engine starting.





Bench testing the starter motor

The starter motor must be tested on a bench equipped with a hydraulic brake. Secure the starter motor to the test bench, connect it to a direct supply then carry out three tests: operation, engagement and no load.
Measure the current absorption, torque, speed and voltage for each test.

The current absorption measurement must refer to the motor only, without the solenoid, so on the test bench the ammeter must be connectd as illustrated in the diagram.

STARTER MOTOR FAULT DIAGNOSIS

1. The motor will not turn

Possible causes:

- battery terminals and/or connectors corroded;
- starter motor supply cable terminal and/or connector corroded;
- starter motor supply cable terminal broken or corroded;
- battery fully discharged;
- no contact between brushes and commutator;
- positive brush short-circuited;
- starter switch contacts corroded, worn or insulated by fragments of material;
- armature or field coil earthed;
- armature or commutator centrifuged.

2. The motor turns very slowly

Possible causes:

- commutator blades and brushes worn;
- some of the armature or field winding coils short-circuited;
- battery terminals and connections corroded;
- battery charge very low, or one or several cells damaged.

3. Excessive noise on starting

Possible causes:

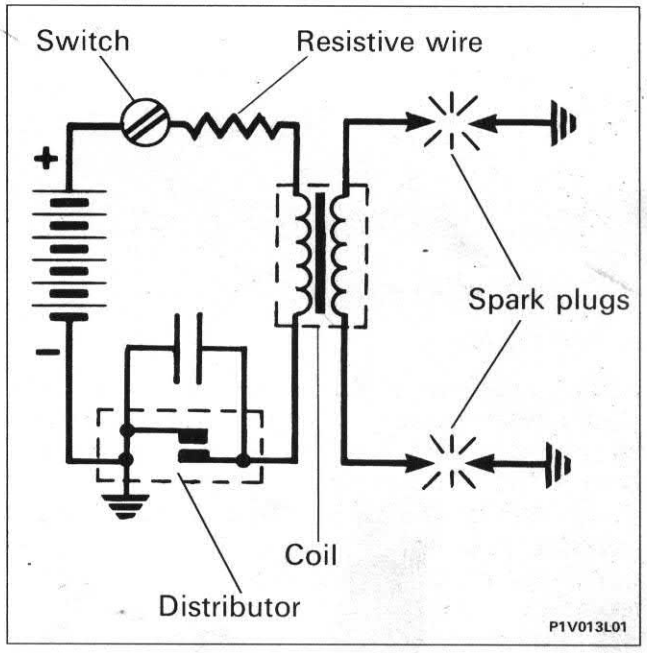
- pinion clutch assembly worn;
- motor incorrectly aligned with flywheel;
- some flywheel teeth excessively worn on engagement side.

COMPONENTS AND OPERATION OF THE IGNITION SYSTEM

The ignition system comprises:

- **distributor** with no cap or rotor
- **coil** with two high tension connections
- **resistive wire**
- **spark plugs**

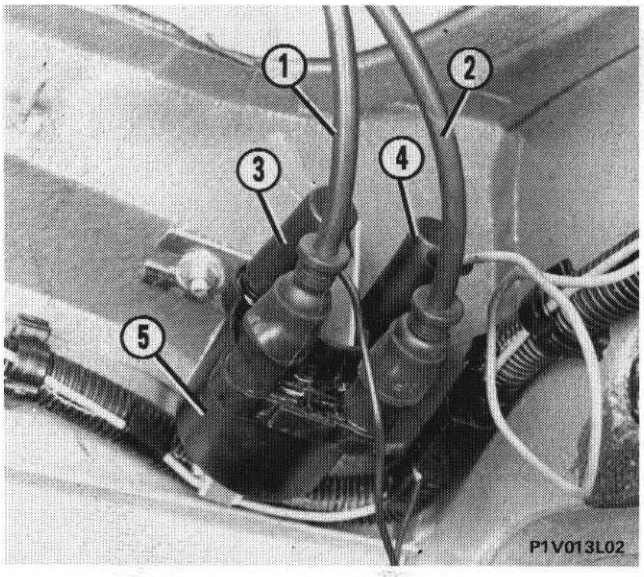
The coil comprises a primary winding connected at one end to the distributor, and at the other end to the battery's positive terminal, via a resistive wire and switch.
The secondary circuit has two terminals which send high tension to the spark plugs whenever the contact breaker points open.



Because of how the secondary circuit is closed (spark plugs located in series), the high tension supplying the plugs will be of varying intensity.

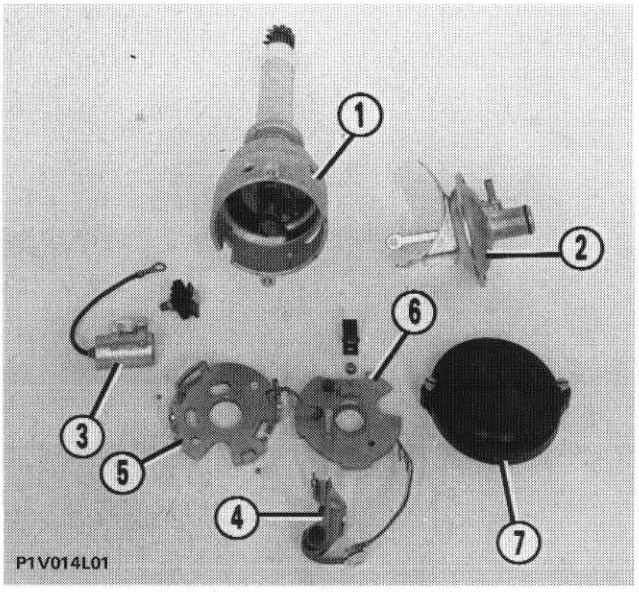
This is is due to the fact that one of the two plugs will periodically be under higher pressure (compression stroke) than the other (exhaust stroke).

Since the current has to overcome a higher dielectric in the plug at the compression stroke, it will produce a brighter spark in the latter, while in the other plug the spark will be insignificant.



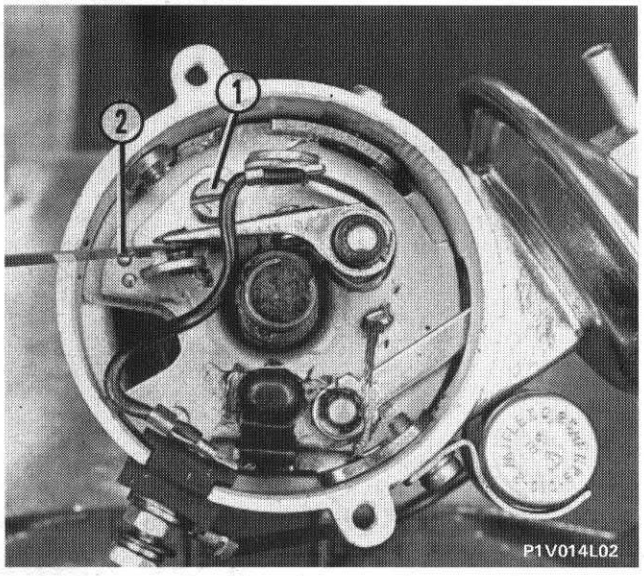
Location of ignition coil in car

1. } High tension leads
2. }
3. Terminal –1 (lead coming from distributor)
4. Terminal +B (lead coming from ignition switch)
5. Ignition coil



Components of the Zelmot 3459 A distributor

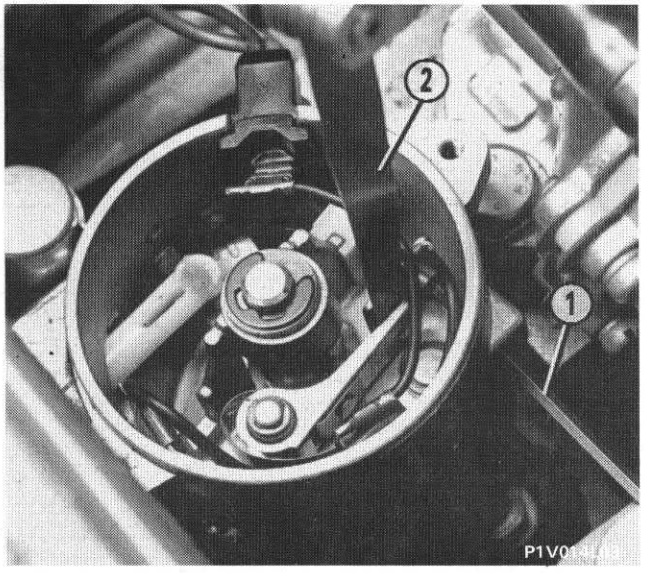
1. Distributor body with shaft and centrifugal weights
2. Vacuum advance diaphragm
3. Condenser
4. Contact breaker points
5. Fixed plate
6. Moving contact breaker plate
7. Dust cover



CONTACT BREAKER ADJUSTMENT

Zelmot 3459 A distributor

1. Fixed contact breaker plate screw
2. Feeler gauge



M. Marelli S 314 A distributor

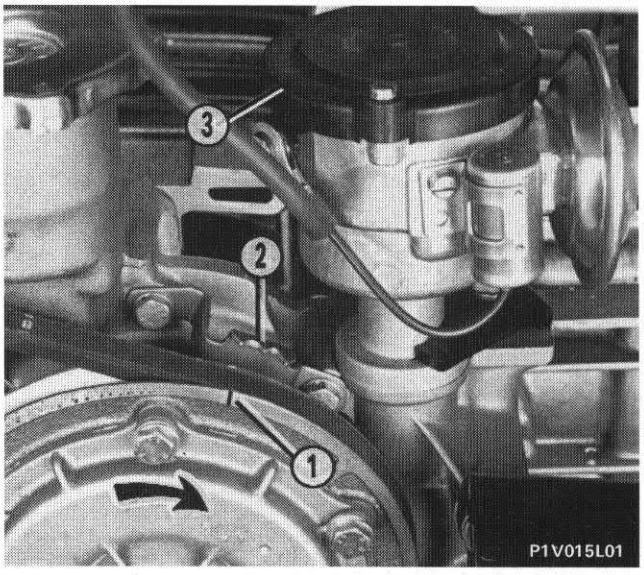
1. Allen key for contact breaker adjustment (turn key to vary points gap)
2. Feeler gauge

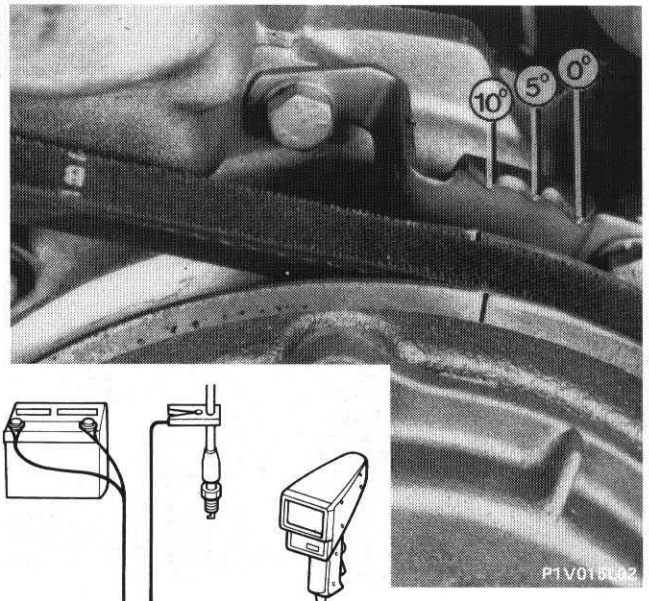
Contact breaker points gap

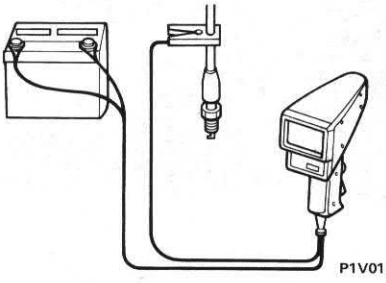
M. Marelli	Zelmot
0.37 - 0.43	0.47 - 0.55

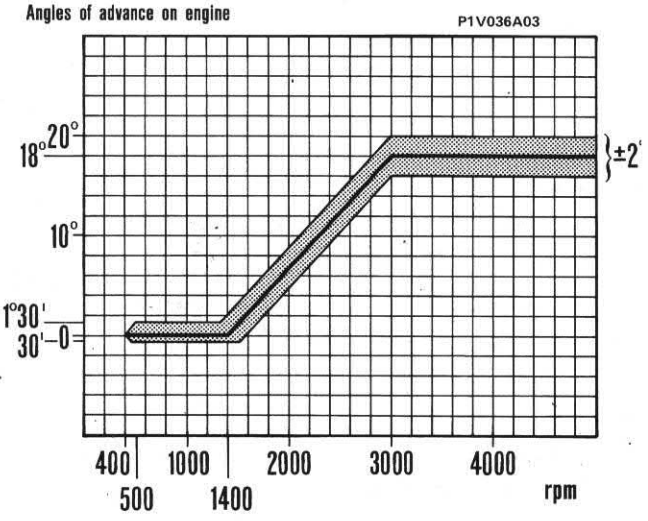
FITTING DISTRIBUTOR AND IGNITION TIMING

Before fitting the distributor, rotate the engine clockwise until the reference mark (1) lines up with the first of the notches (2).
Remove the distributor dust cover (3) and rotate the shaft until the contact breaker points are just beginning to open. Then press the distributor into its housing.
Disconnect the vacuum pipe from the vacuum unit and obstruct it.
Connect a stroboscopic lamp, start the engine and run it at 750-800 rpm, then check using the lamp that the mark on the pulley lines up with the first notch on the plate.
To obtain the correct advance position, rotate the distributor in its housing, then tighten it.
The ignition timing at idle thus obtained is 10° before T.D.C., i.e. the specified value.
Reconnect the vacuum pipe to the vacuum unit and disconnect the lamp.

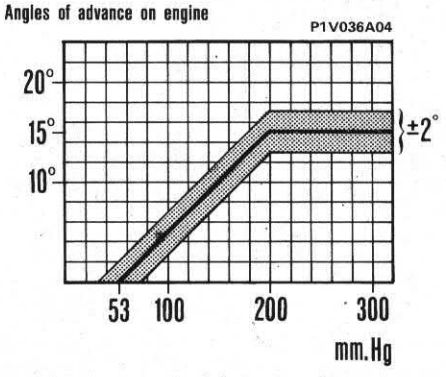






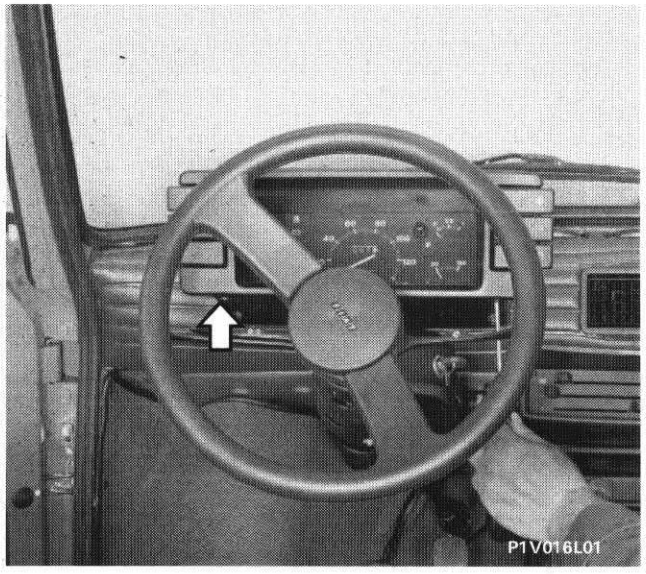


Graph showing automatic advance of distributor on engine



Graph showing vacuum advance of distributor on engine

55.

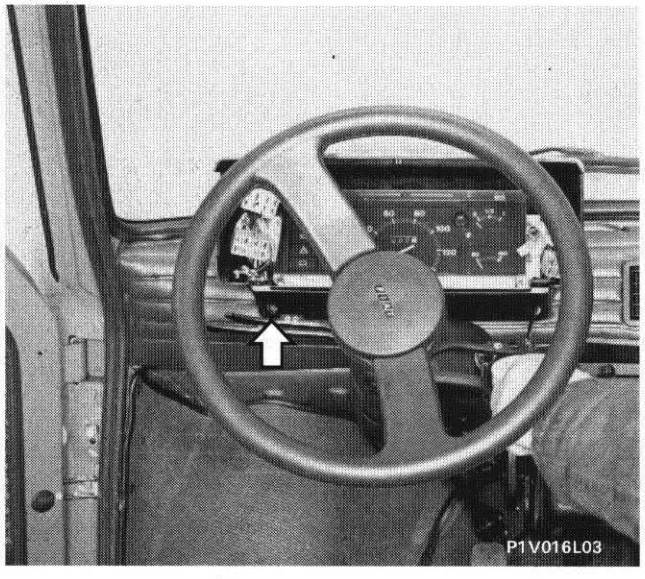


REMOVAL-REFITTING

Removing switch panel bolts

Withdrawing switch panel

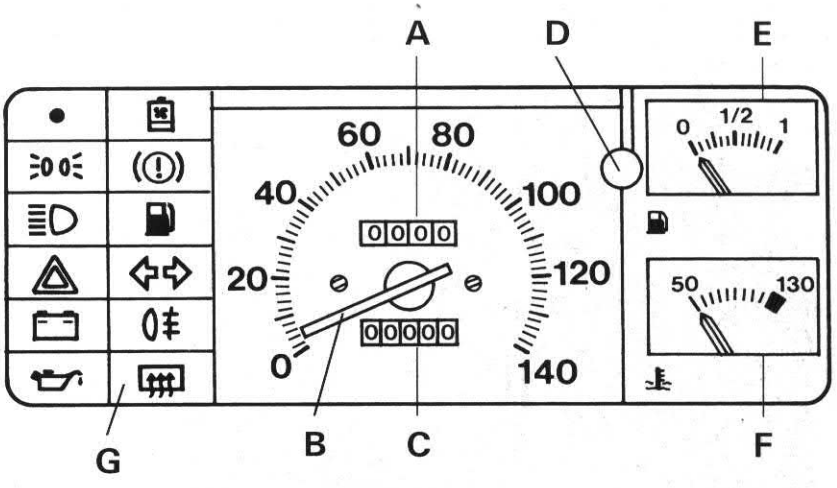
The top of the panel slots into its frame.



Removing instrument panel bolts

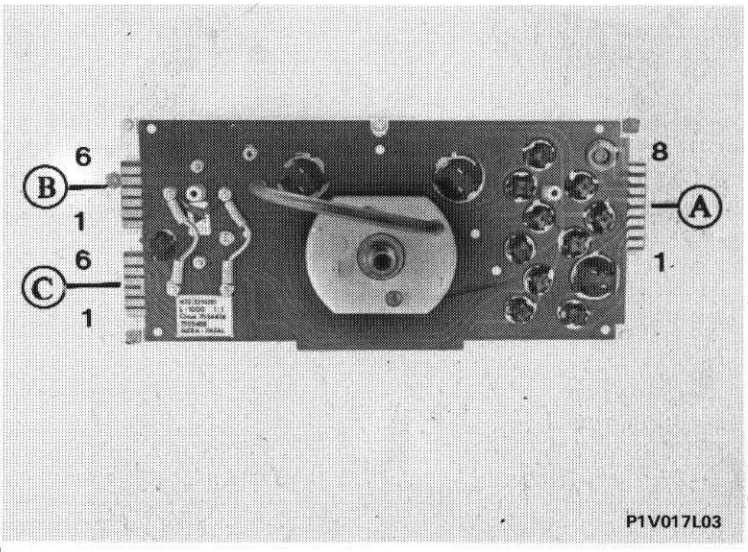
Removing instrument panel from the fascia

- disconnect the speedometer cable from the instrument panel
- disconnect all the electrical connectors from the instrument panel



Front of instrument panel

A. Trip recorder
B. Speedometer
C. Odometer
D. Trip recorder reset button
E. Fuel gauge
F. Water gauge
G. Warning lights



Rear view of instrument panel with terminal strips for connecting up the car's electrics

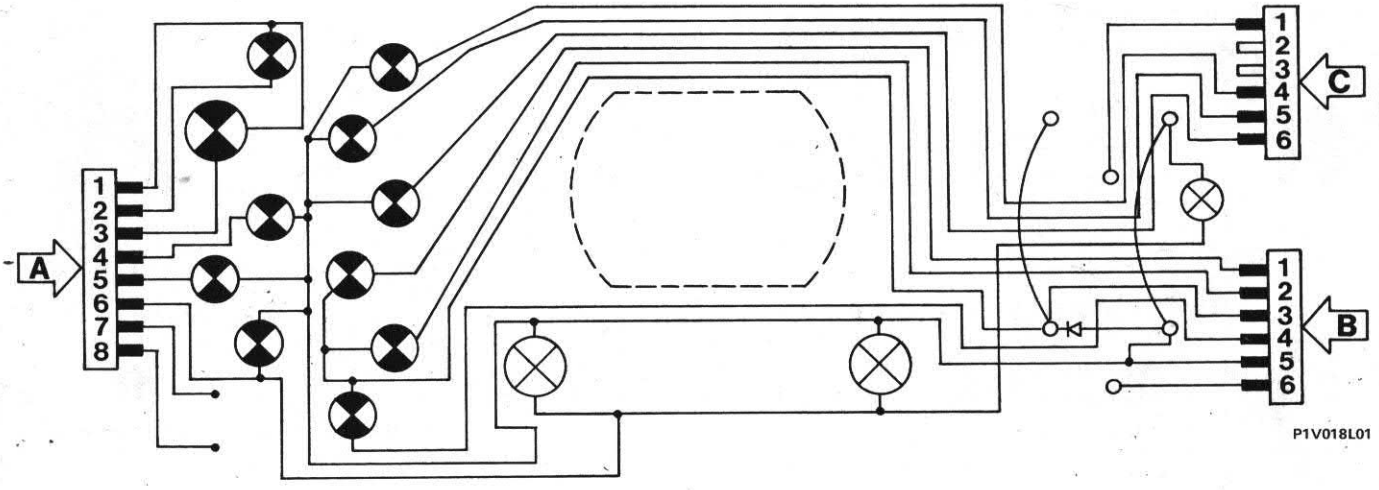
NOTE *The terminals and terminal strips are identified by the same numbers and letters as those used on the wiring diagrams.*

55.

CONNECTOR A		
A	1	+ from ignition switch
HG	2	Low oil pressure warning light, from oil pressure warning sender
NZ	3	Low battery charge warning light: from + D alternator terminal
SN	4	Hazard lights indicator: from hazard lights flasher unit
VN	5	Main beam warning light from fuse F6 in the fuse holder
GR	6	Parking lights warning light: from cigar lighter illumination bulb
–	7	Free
–	8	Free

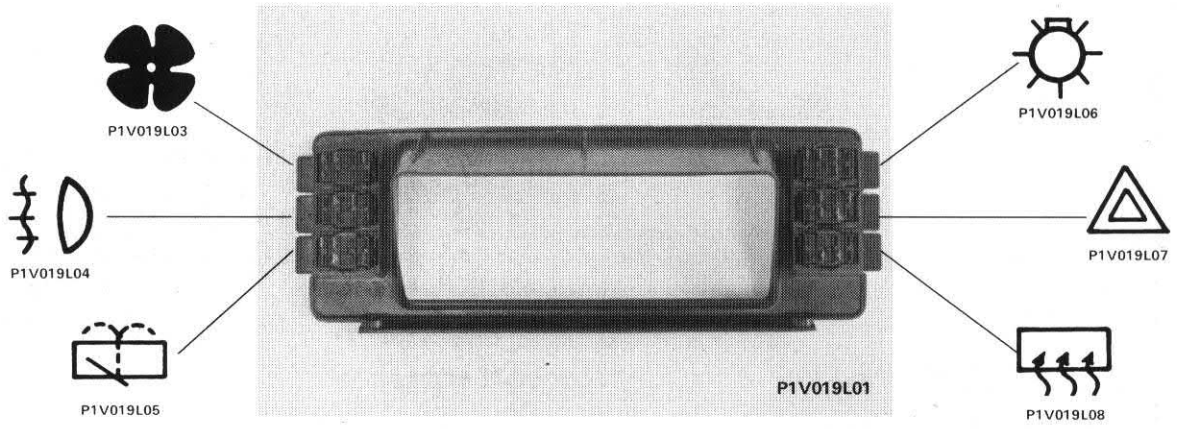
CONNECTOR B		
HR	1	Fuel reserve warning light: from fuel gauge control
BN	2	Low brake fluid level warning light: from low brake fluid level sender
AN	3	+ from fuse holder: from fuse D4
HN	4	Low water level warning light: from low water level sender
N	5	Earth cable, to multiswitch
AG	6	Fuel gauge: to fuel gauge control

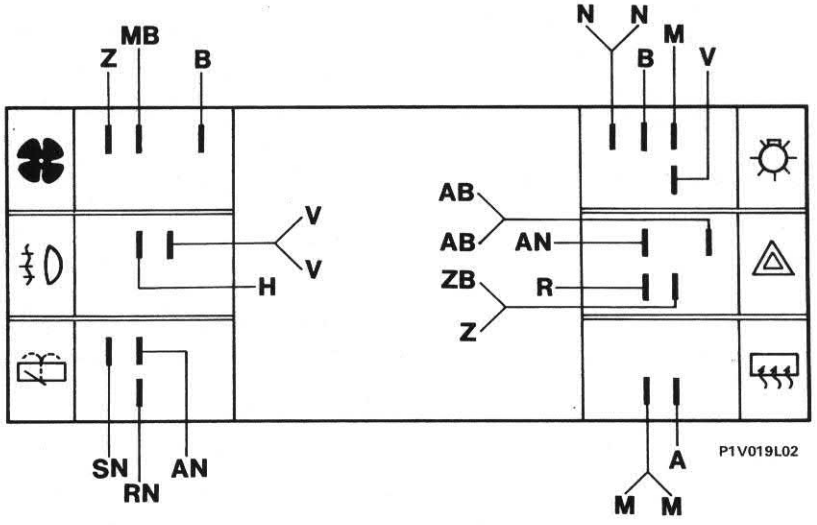
CONNECTOR C		
VB	1	Water temperature gauge: from water temperature sender
–	2	Free
–	3	Free
M	4	Heated rear window warning light: from heated rear window switch
V	5	Rear fog lamp warning light: from rear fog lamp switch
AR	6	Direction indicators warning light: from direction indicators intermittent switch on fuse holder



Wiring diagram of instrument panel

SWITCH PANEL – Rear view with terminal strips for connectors



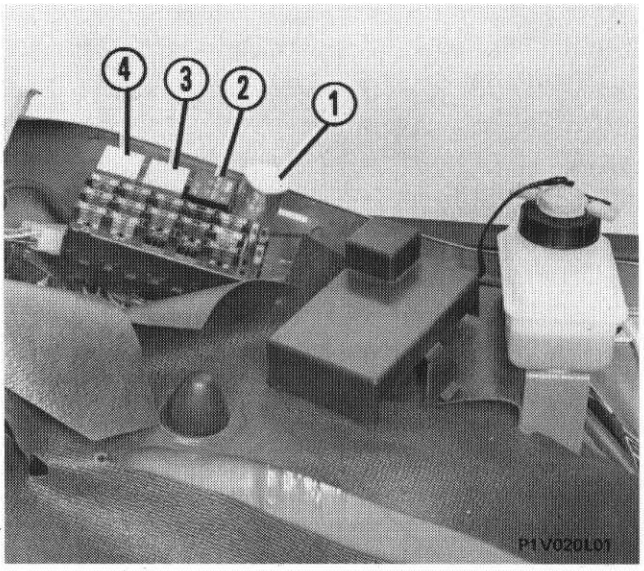


Fascia wiring connections to the car's electrics

	MB + from fuse holder B To electric fan motor - 1st speed Z To electric fan motor - 2nd speed		N + from ignition switch INT terminal N + to headlamp flasher on multiswitch M + from ignition switch 30 B + to fuse holder V + to lights multiswitch
	V To rear fog lamp + supply cable V To instrument panel warning light H + from fuse holder branched from right dipped beam headlamp wire		AN + direction indicators intermittent switch supply AB + from fuse holder (fuse 4) AB + to braking lights switch Z + from fuse holder (fuse 1) ZB + to courtesy light R + to hazard lights intermittent switch
	SN + to rear window washer pump AN + from fuse holder RN + to rear window wiper motor		A + from fuse holder M + to heated rear window M + to instrument panel warning light

55.

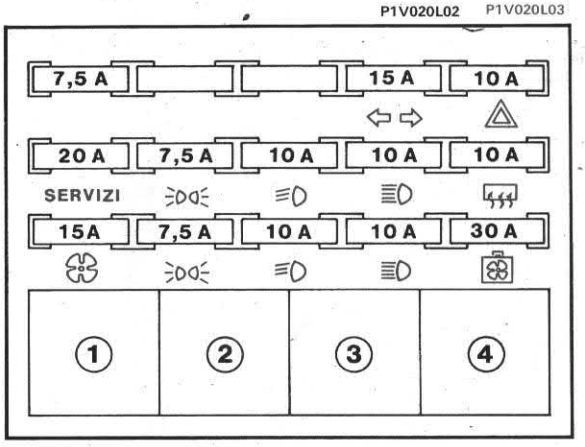
LOCATION OF FUSE AND RELAY HOLDER



1. Direction indicators
2. Windscreen wiper intermittent switch
3. Radiator cooling electric fan relay
4. Horn relay

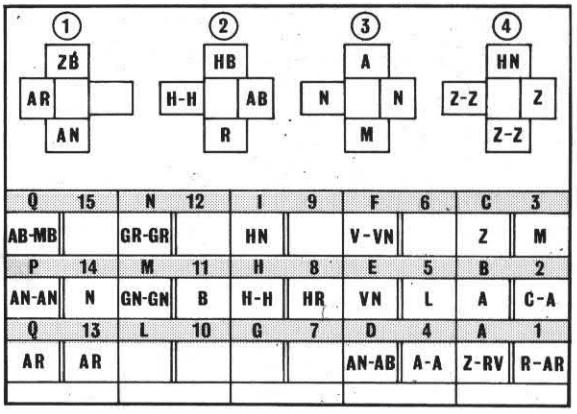
Fuse symbol	Fuse number	Protected circuits
	A-1	Hazard lights and warning light - Courtesy light - Horn
	B-2	Heated rear window and warning light
	C-3	Radiator cooling fan
	D-4	Direction indicators and warning light - Braking lights - Handbrake warning light - Fuel gauge
	E-5	Left main beam headlamp
	F-6	Right main beam headlamp and warning light
	G-7	Free
	H-8	Right dipped beam headlamp and warning light - Rear fog lamp and warning light
	I-9	Left dipped beam headlamp
	L-10	Free
	M-11	Front left parking light - Rear right parking light - Parking lights warning light - Number plate light and instrument panel light
	N-12	Front right parking light - Rear left parking light
	O-13	Fast idle solenoid
SERVIZI	P-4	Windscreen wiper and intermittent switch - Windscreen washer pump - Rear window wiper - Rear window washer pump
	Q-15	Car interior fan - Reversing light

P1V020L02 P1V020L03



Front view of fuse holder and symbols of the main protected circuit

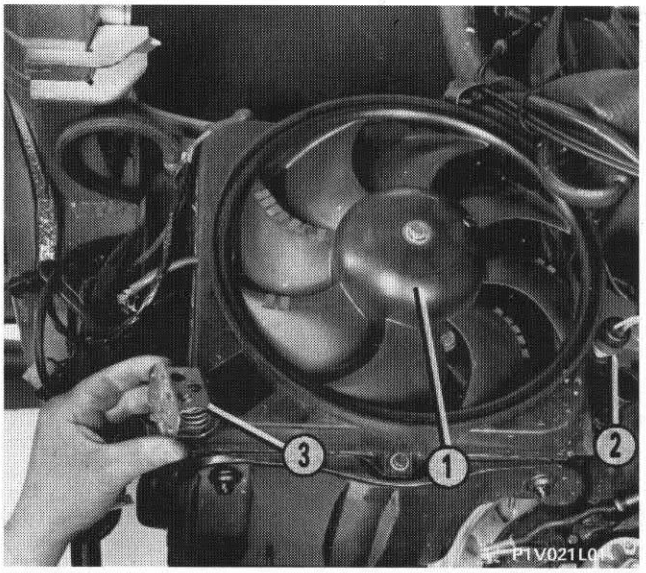
P1V020L04



Q 15		N 12		I 9		F 6		C 3	
AB-MB		GR-GR		HN		V-VN		Z	M
P 14		M 11		H 8		E 5		B 2	
AN-AN	N	GN-GN	B	H-H	HR	VN	L	A	C-A
Q 13		L 10		G 7		D 4		A 1	
AR	AR					AN-AB	A-A	Z-RV	R-AR

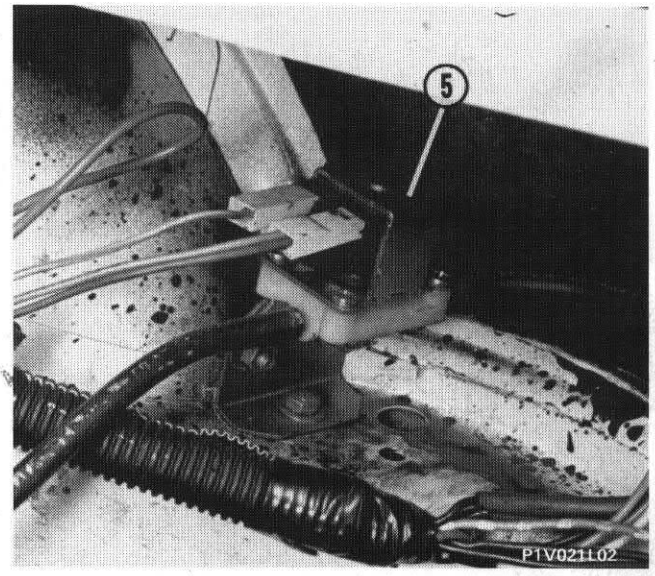
Rear view of fuse holder and colours of fuse and relay input cables

RADIATOR COOLING FAN



Location of components

1. Radiator cooling fan motor
2. Two-stage thermal switch
3. Additional resistor
5. Fast idle solenoid



Location of fast idle solenoid

COMPONENT SPECIFICATIONS

Electric fan motor (1)

With a 12 V supply, it should run at 3000 ± 100 rpm.
Power 110 W

Additional resistor (3)

0.30 ± 0.05Ω

Thermal switch (2)

⇄	96 - 100°C	101 - 105°C
stop	90 - 94°C	95 - 90°C

55.

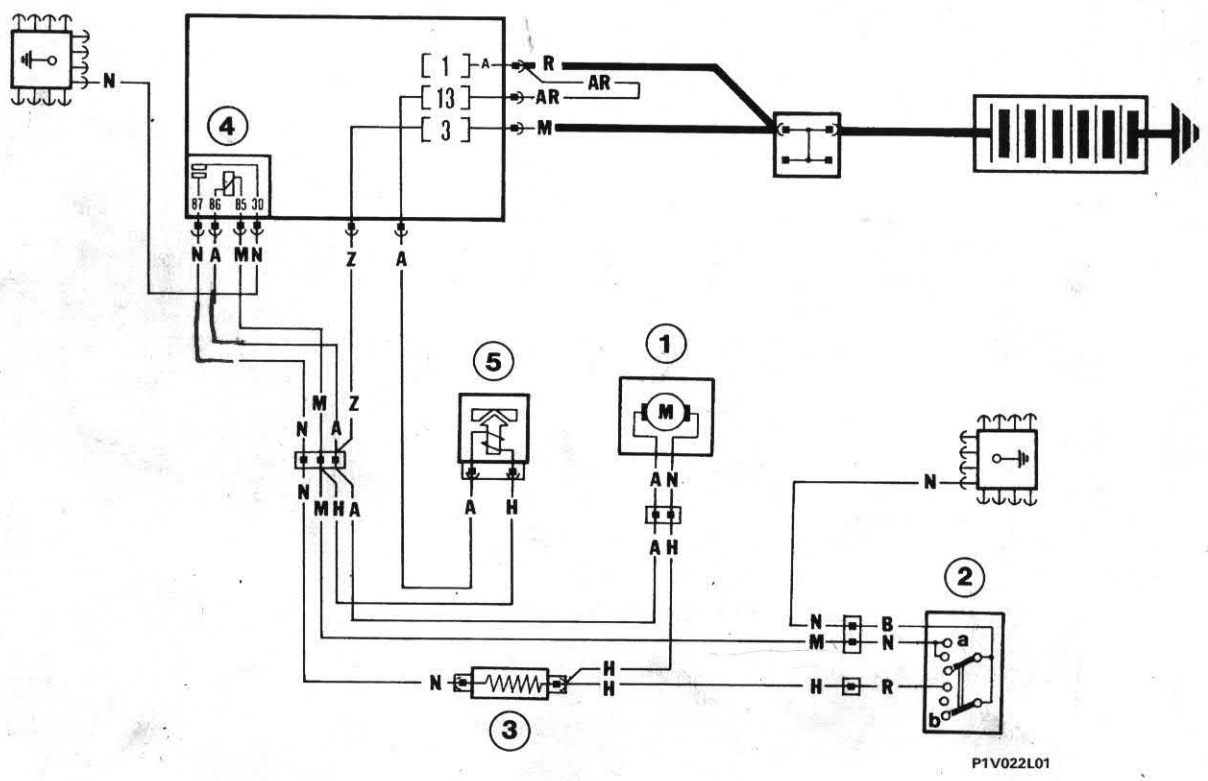
Operation

A two-speed radiator cooling fan is fitted on the new 126 BIS versions. The fan (1) is controlled by the two-stage thermal switch (2). When the coolant temperature reaches 95-97°C, the first contact a) closes, the thermal switch earths the exciting circuit of the relay (4) and current passes through resistor (3), supplying the fan (1) and enabling it to operate at the first speed.

When the coolant temperature reaches 103-105°C, contact b) of the thermal switch (2) also closes, so the fan is directly earthed and the second operating speed is enabled.

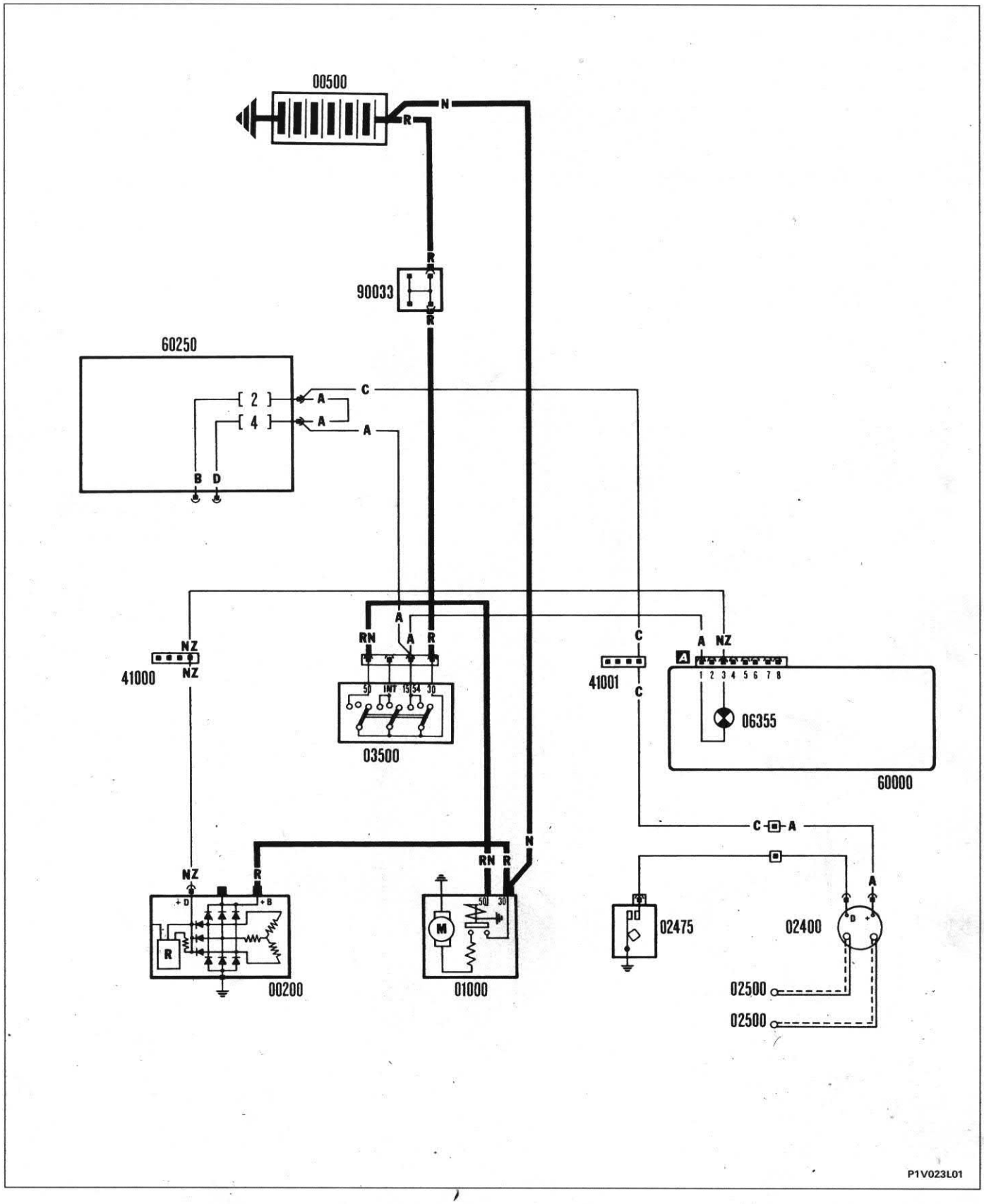
In addition, to counteract the reduction in engine speed caused by the extra power absorption after the fan's entry into operation, a fast idle solenoid is fitted (5). This is excited when the thermal switch (2) closes and allows the vacuum in the inlet manifold to come into contact with a diaphragm device mounted on the carburettor, which increases the throttle valve aperture and so makes up for a drop in engine speed.

Wiring diagram



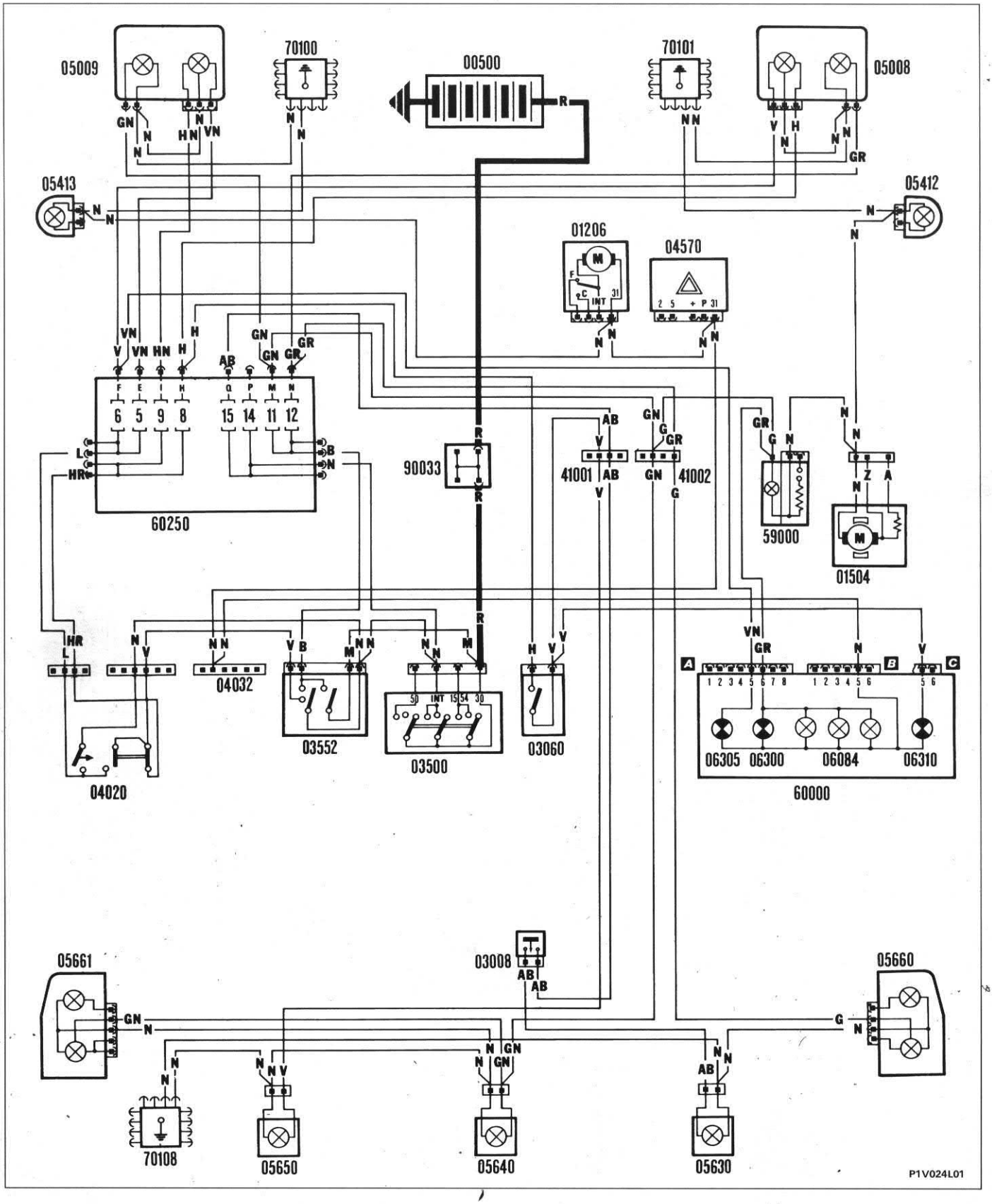
1. Radiator fan
2. Two-stage thermal switch
3. Additional resistor
4. Relay
5. Fast idle solenoid

Starting - Ignition - Recharging (see legend on p. 29)



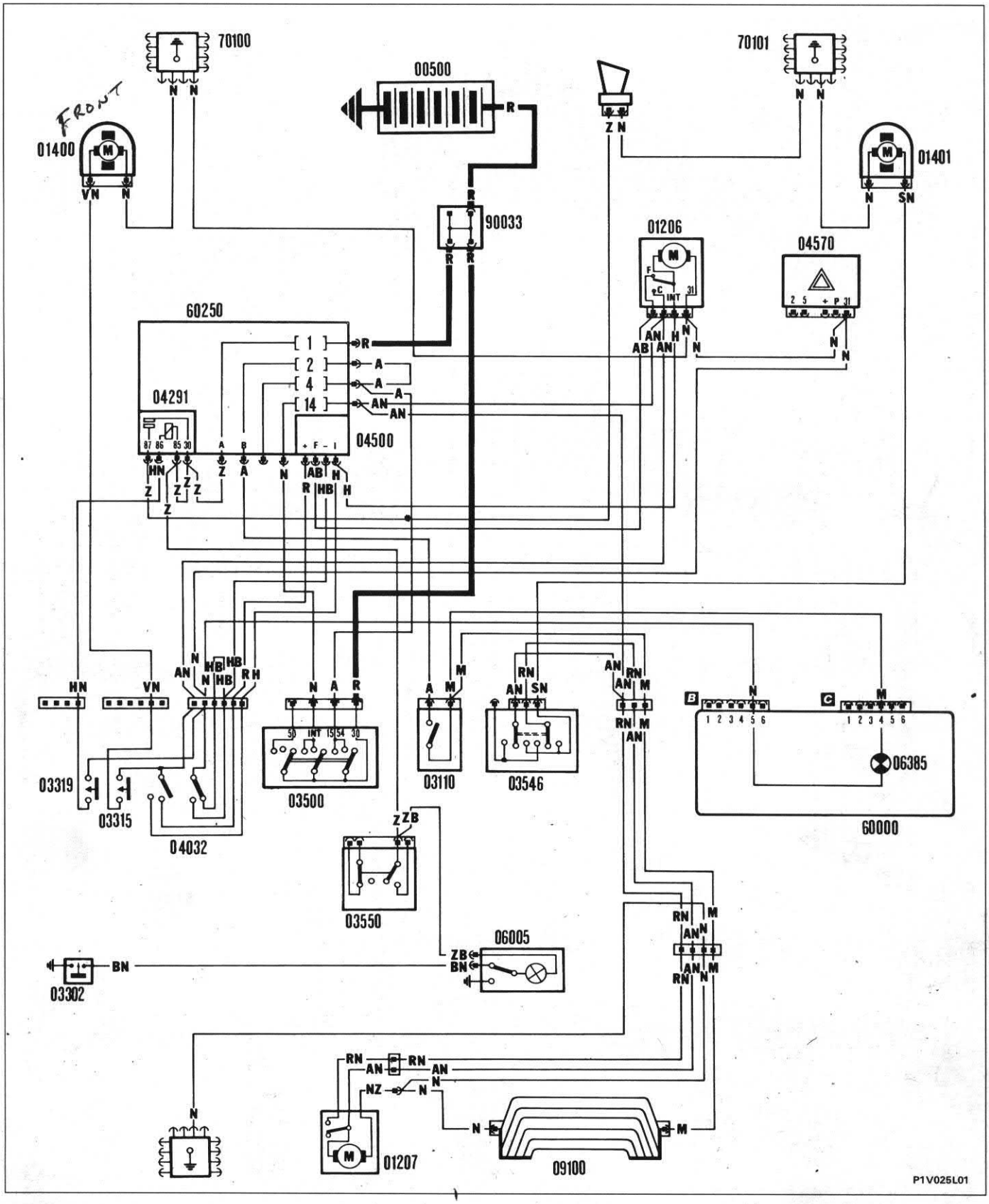
55.

Parking lights and warning light - Dipped beam headlamps - Main beam headlamps and warning light - Headlamp flasher - Number plate light - Reversing light - Rear fog lamp and warning light (see legend on p. 29)



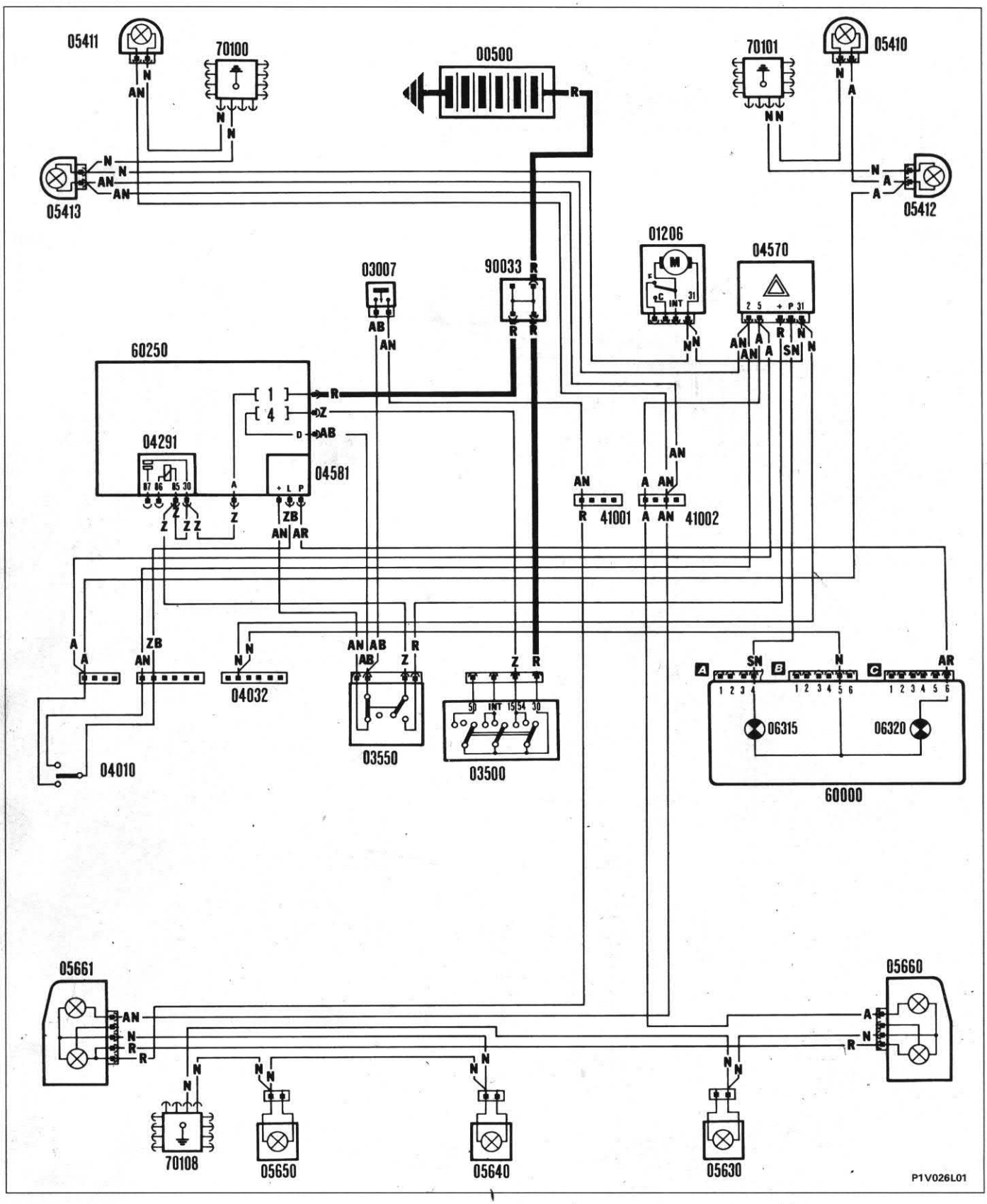
55.

Horn - Windscreen wiper - Windscreen washer pump - Courtesy light - Rear window wiper - Rear window washer pump - Heated rear window (see legend on p. 29)

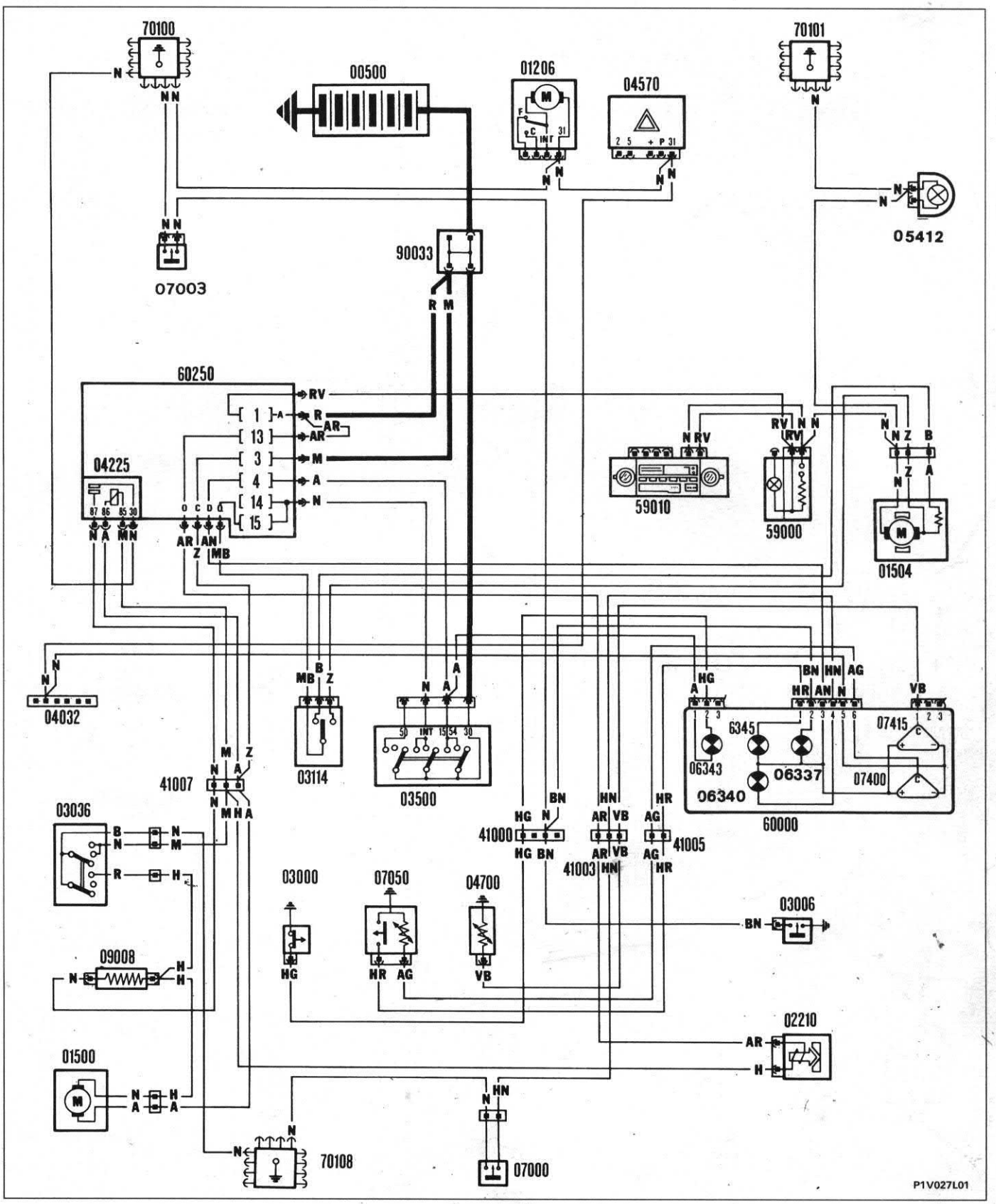


55.

Direction indicators and warning light - Hazard lights and warning light - Braking lights (see legend on p. 29)

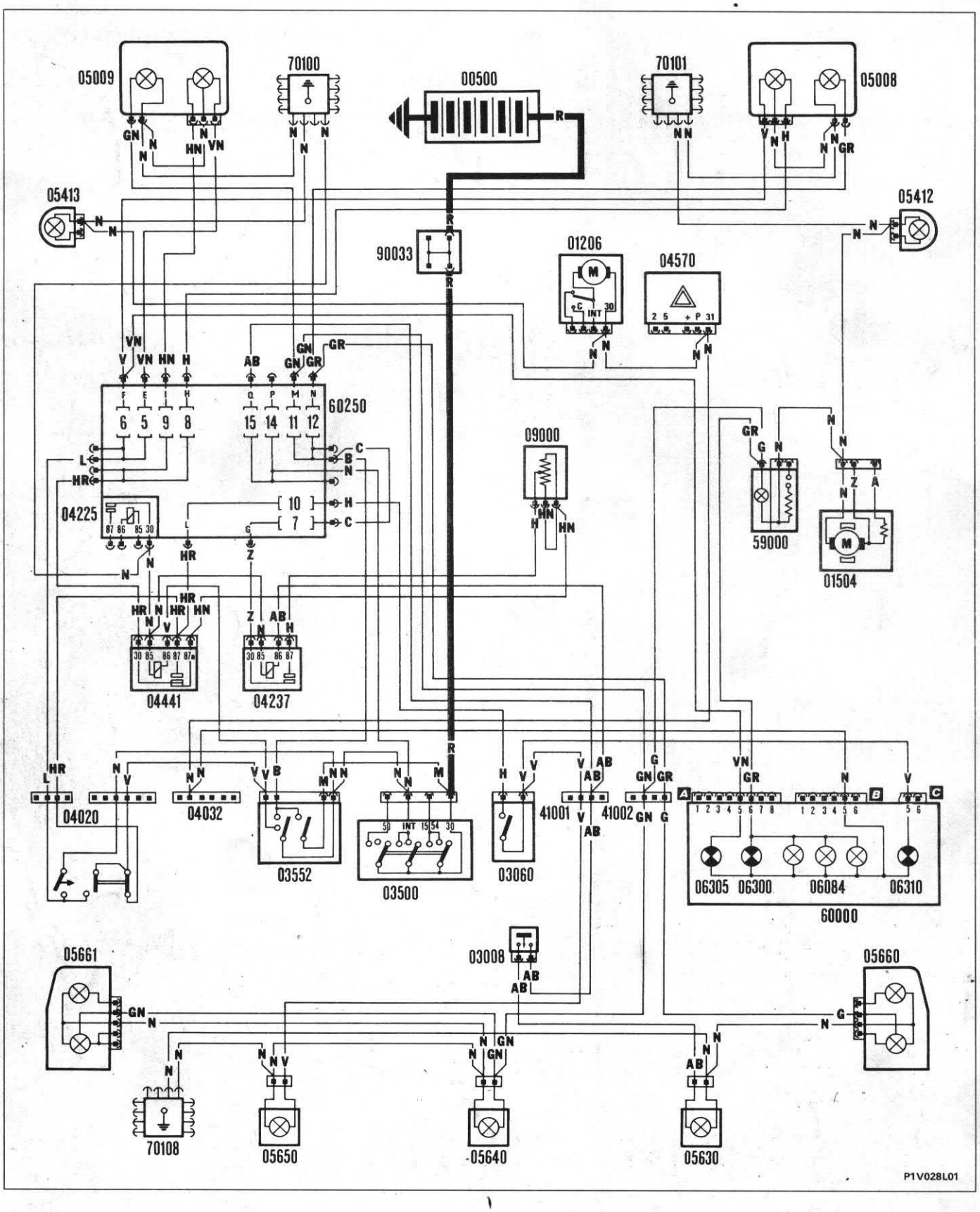


Radiator cooling fan - Car interior fan - Radio arrangement - Fuel gauge and reserve warning light - Low water level warning light - Low oil pressure warning light - Water temperature gauge (see legend on p. 29)



55.

Parking lights and warning light - Dipped beam headlamps attenuated with DIM-DIP device - Main beam headlamps and warning light - Headlamp flasher - Number plate light - Reversing light - Rear fog lamp and warning lamp (see legend on p. 29)

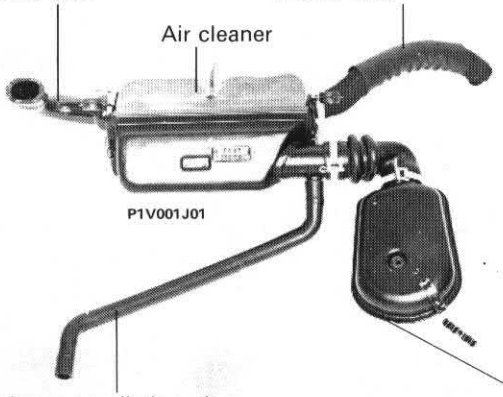


00200 Alternator with integral regulator
00500 Battery
01000 Starter motor
01206 Windscreen wiper motor
01207 Rear window wiper motor
01400 Windscreen washer pump
01401 Rear window washer pump
01500 Radiator cooling fan
01504 Car interior fan
02210 Fast idle solenoid
02400 Ignition coil
02475 Distributor
02500 Spark plugs
03000 Low oil pressure sensor
03006 Handbrake warning light control button
03007 Brake pedal braking lights switch
03008 Reversing light switch
03036 Radiator cooling fan two-stage thermostatic switch
03060 Rear fog lamp switch
03110 Heated rear window switch
03114 Car interior fan switch
03302 Courtesy light control button
03315 Windscreen washer pump control button
03319 Horn push
03500 Ignition switch
03550 Hazard warning lights switch
03552 Exterior lights switch
04010 Direction indicators control
04020 Main beam and dipped beam headlamps control
04032 Windscreen wash/wipe control
04225 Radiator cooling fan relay
04237 DIM-DIP circuit relay
04291 Horn relay
04441 DIM-DIP circuit exclusion switch
04500 Windscreen wiper intermittent switch
04570 Hazard lights intermittent switch
04581 Direction indicators intermittent switch
04700 Water temperature sender
05008 Front right lights cluster
05009 Front left lights cluster
05410 Front right direction indicator cluster
05411 Front left direction indicator cluster
05412 Right side repeater
05413 Left side repeater
05630 Reversing light
05640 Number plate light
05650 Rear fog light
05660 Rear right light
05661 Rear left light
06005 Ceiling courtesy light
06084 Instrument illumination bulbs
06300 Parking lights warning light
06305 Main beam headlamps warning light
06310 Rear fog lamp warning light
06315 Hazard lights warning light
06320 Direction indicators warning lamp
06337 Handbrake and brake fault warning light
06340 Low water level warning light
06343 Low oil pressure warning light
06345 Fuel reserve warning light
06355 Low alternator charge warning light
06800 Horn
07000 Low water level warning light switch
07003 Brake fluid level sensor
07050 Fuel gauge and reserve warning light control
07060 Idle cut-off solenoid
07400 Fuel gauge
07415 Water gauge
09000 DIM-DIP system dropping resistor
09008 Radiator fan speed adjustment dropping resistor
09100 Heated rear window
41000 Connection
41001 Connection
41002 Connection
41003 Connection
41004 Connection
41005 Connection
59000 Cigar lighter
59010 Radio
60000 Instrument pane
60230 Fuse holder junction unit
70100 Front left earth point
70101 Front right earth point
70108 Rear earth point
90033 Junction point

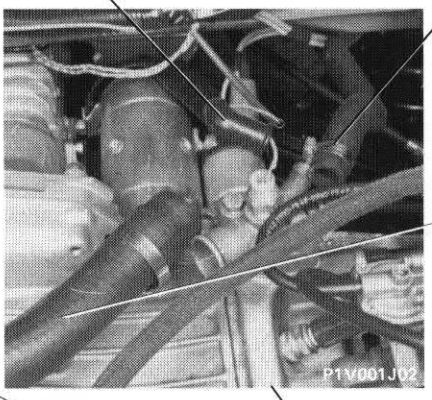
Cable colour codes

A	Light Blue
B	White
C	Orange
G	Yellow
H	Grey
L	Dark Blue
M	Brown
N	Black
R	Red
S	Pink
V	Green
Z	Purple
AB	Light Blue-White
AG	Light Blue-Yellow
AN	Light Blue Black
AR	Light Blue-Red
AV	Light Blue-Green
BG	White-Yellow
BL	White-Dark Blue
BN	White Black
BR	White-Red
BV	White Green
BZ	White-Purple
CA	Orange Light Blue
CB	Orange-White
CN	Orange-Black
GN	Yellow-Black
GL	Yellow-Dark Blue
GR	Yellow Red
GV	Yellow-Green
HG	Grey Yellow
HN	Grey-Black
HR	Grey-Red
HV	Grey Green
LB	Dark Blue-White
LG	Dark Blue Yellow
LN	Dark Blue-Black
LR	Dark Blue-Red
LV	Dark Blue-Green
MB	Brown-White
MN	Brown-Black
NZ	Black-Purple
RB	Red White
RG	Red-Yellow
RN	Red-Black
RV	Red-Green
SN	Pink-Black
VB	Green White
VN	Green-Black
VR	Green Red
ZB	Purple-White

Position the car on ramps. Proceed as follows:
- disconnect the battery's negative lead (under the bonnet);
- open the tailgate, remove the trim and fold down the rear seat squab;
- drain the coolant



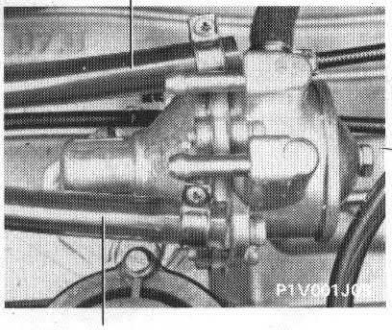
- Disconnect the water temperature sender wire



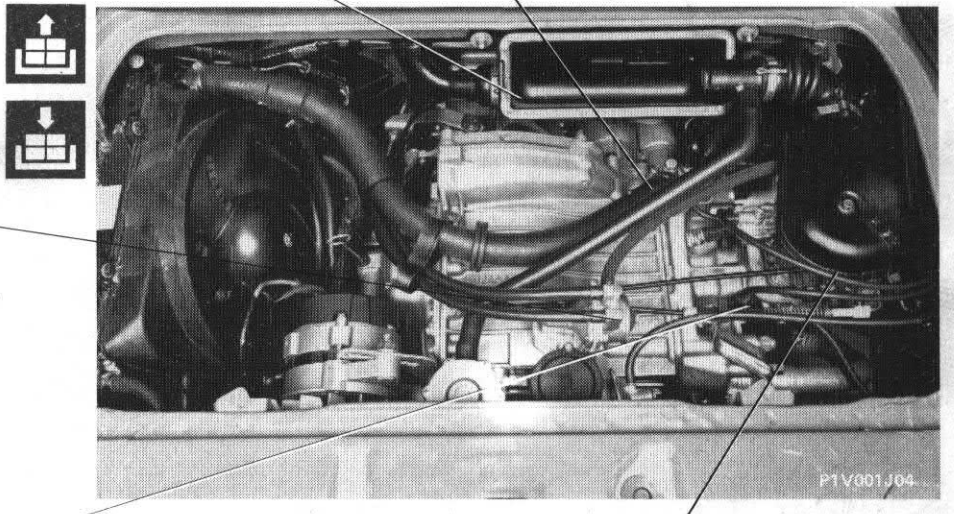
- Disconnect the water hose between the cylinder head and radiator/heater

- Disconnect the water hose between the cylinder head and cooling radiator

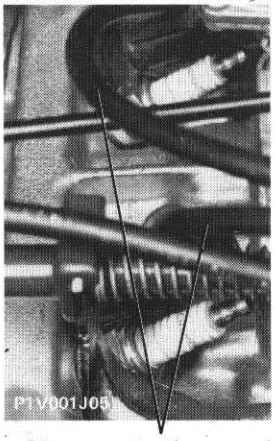
- Disconnect the petrol inlet pipe



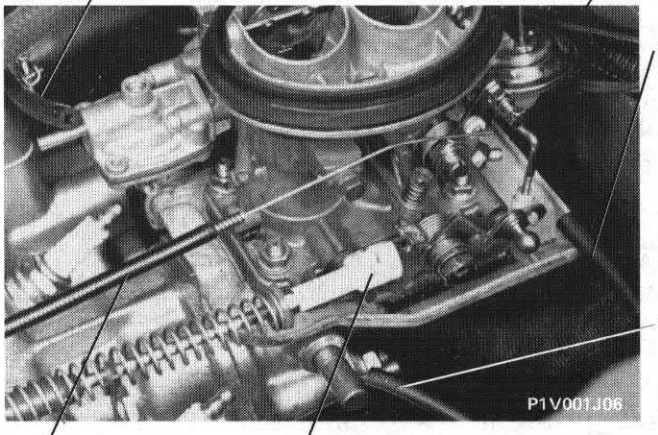
- Disconnect the petrol return pipe to the tank



- Disconnect the fast idle vacuum connection from its capsule



- Disconnect the spark plug supply leads



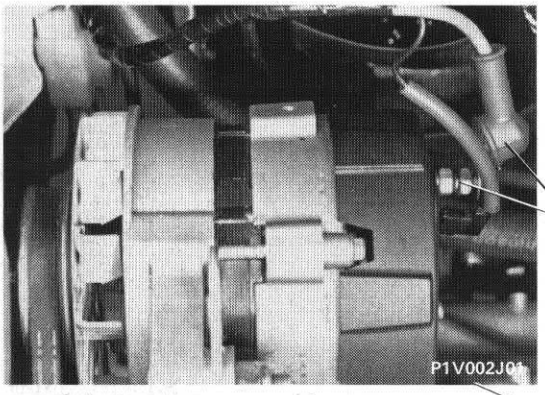
- Disconnect the carburettor fast idle vacuum connection

- Diconnect the distributor vacuum connection cable

- Disconnect the accelerator linkage

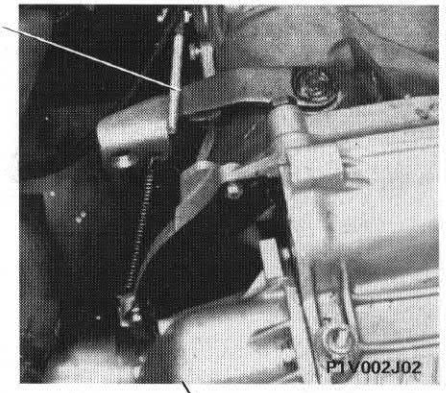
- Disconnect the choke cable

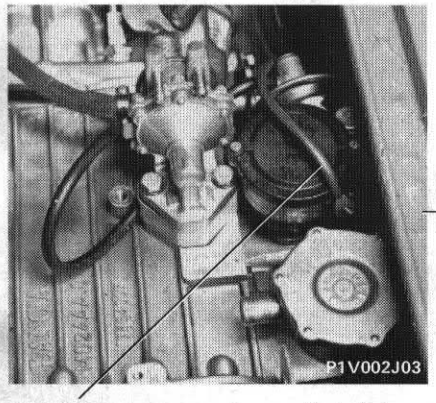
10.



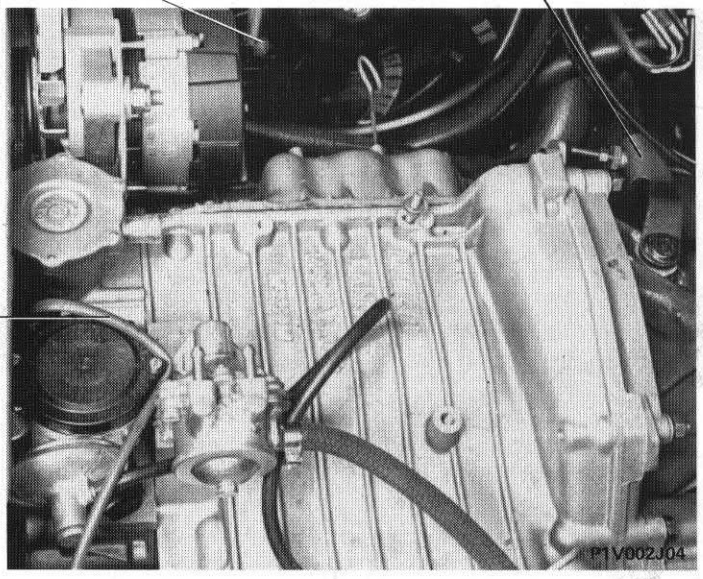
– Disconnect the alternator wiring

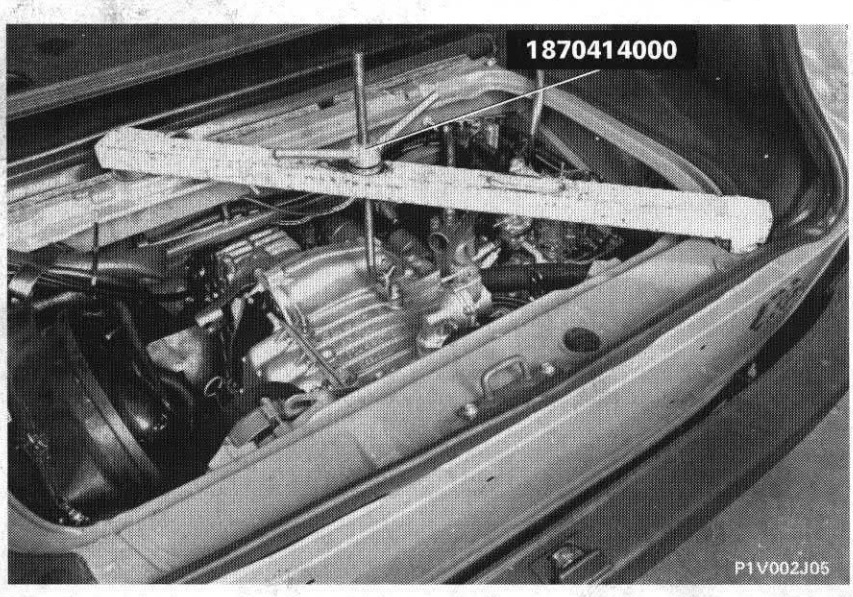
– Disconnect the clutch cable





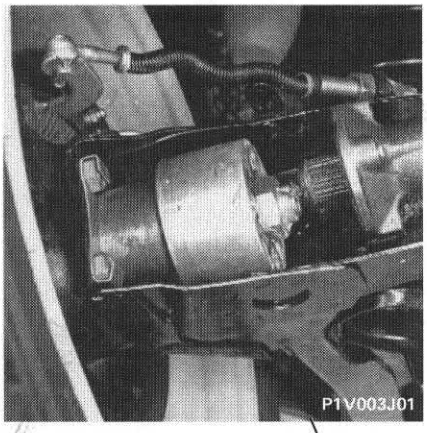
– Disconnect the distributor supply lead



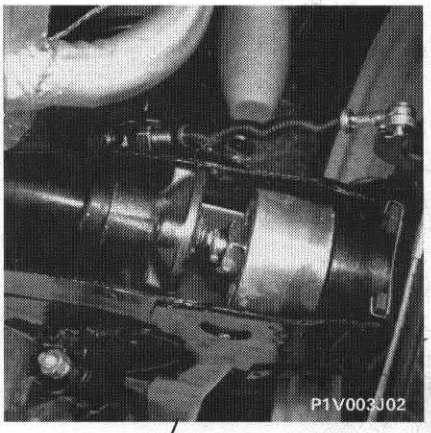


– Fit crossbar 1870414000 and support the engine with the special hook (as shown in the photo opposite)

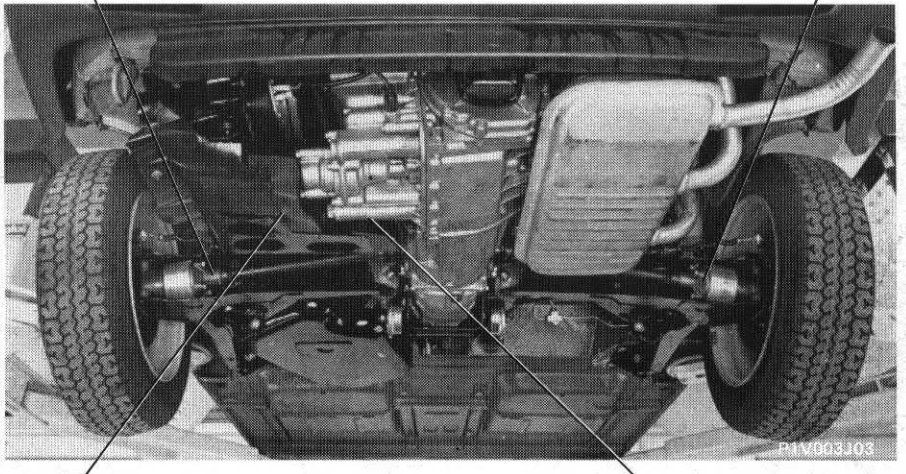
– Raise the car and dismantle as follows:

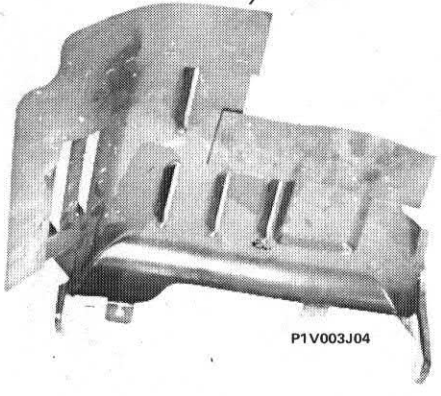


– Disconnect the left driveshaft



– Disconnect the right driveshaft



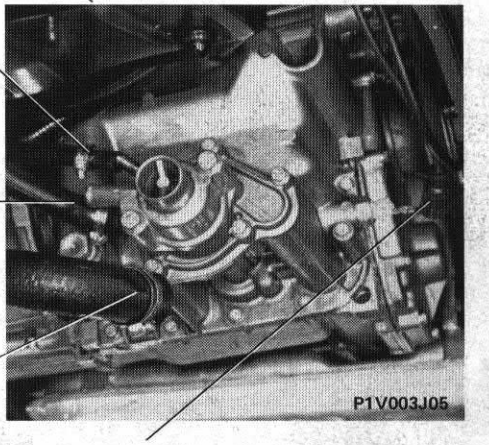


– Remove the engine cooling radiator air duct guard

– Disconnect the water hose between the cylinder head and thermostat

– Disconnect the water hose between the radiator/heater and thermostat

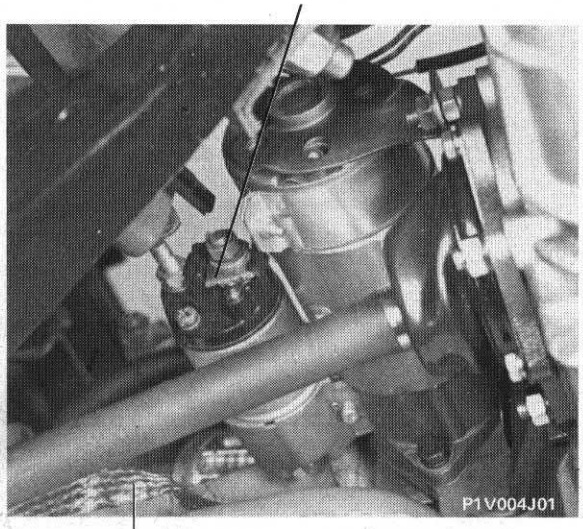
– Disconnect the water hose between the cooling radiator and thermostat

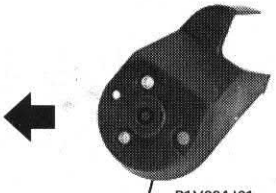


– Disconnect the low oil pressure sender wire

10.

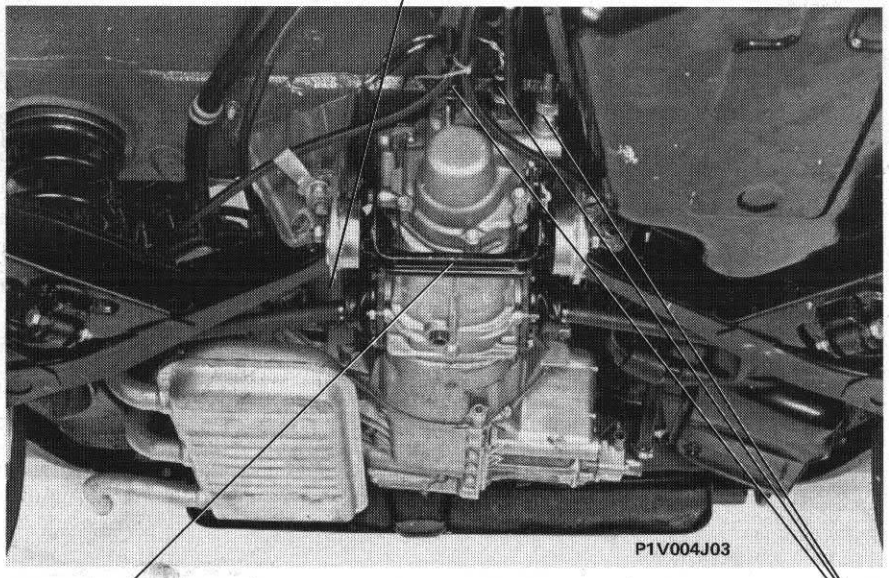
– Disconnect the starter motor supply wire

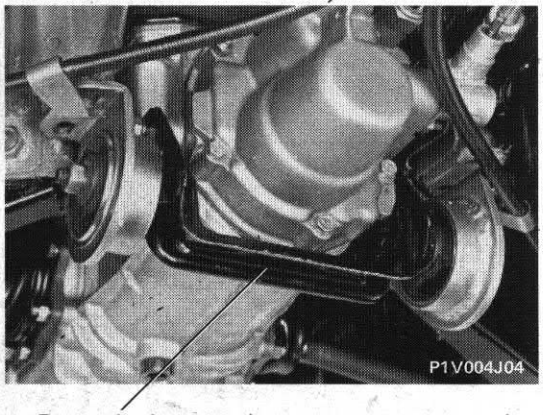




– Remove the starter motor guard

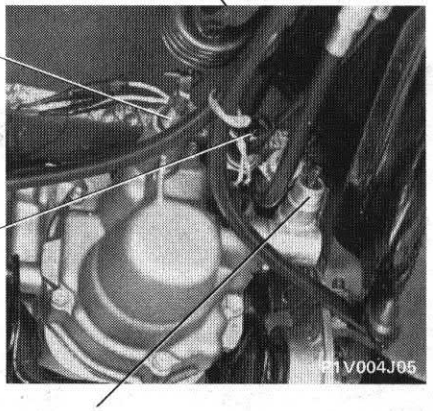
– Disconnect the earth lead





– Remove the gear control rod from the gearshift lever

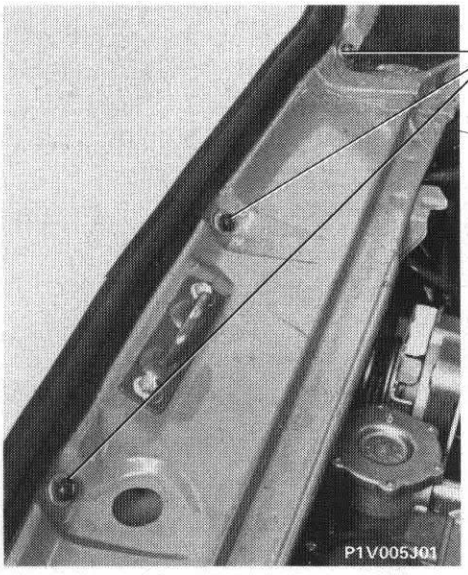
– Disconnect the reversing light switch wire



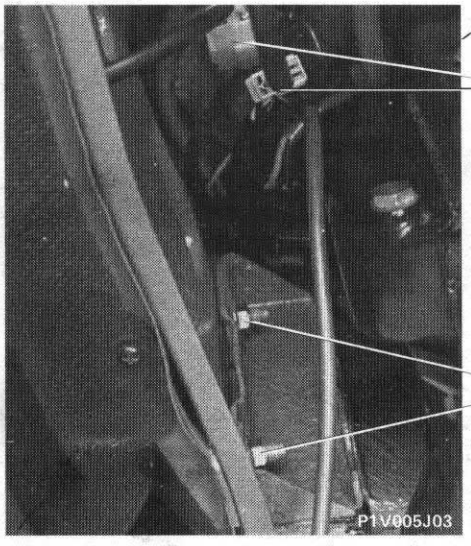
– Detach the gearbox support crosspiece from the body

– Disconnect the speedometer cable

– Lower the ramps and disconnect the following:

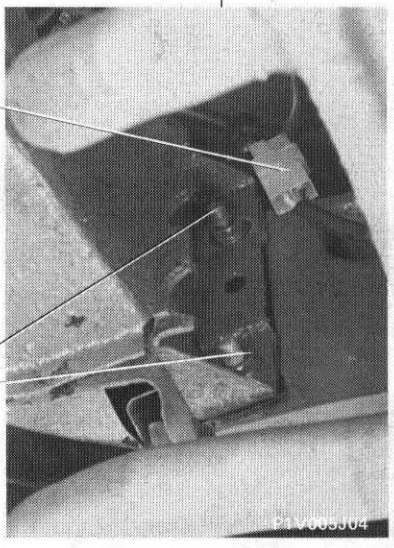


– Remove the bolts securing the rear valance to the top rear crossmember



– Disconnect the reversing light and fog lamp electrical connections

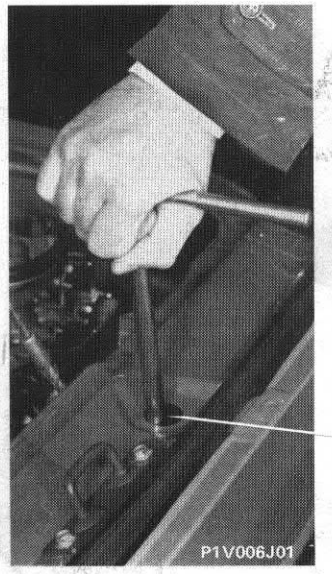
– Remove the 4 nuts securing the rear valance to the body (side)

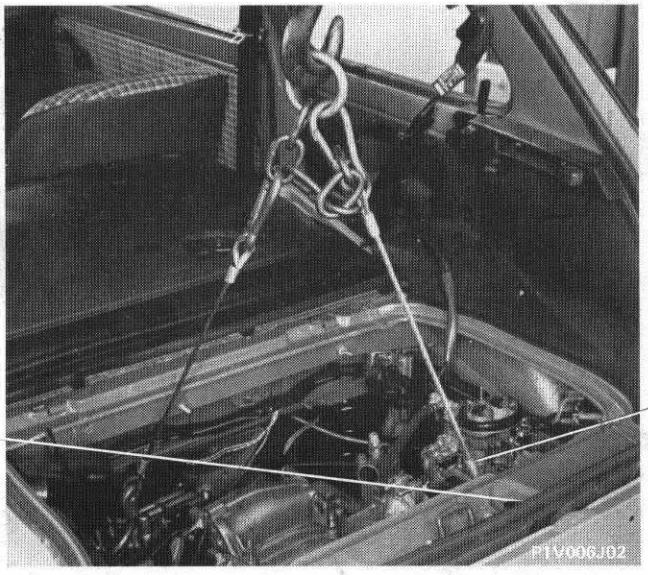


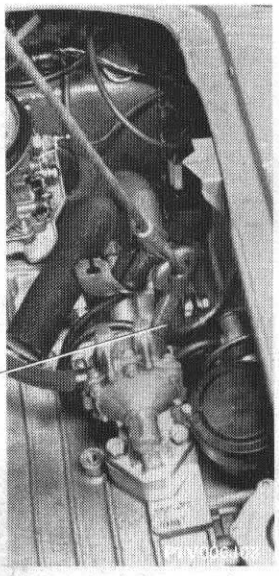
– Fit the universal hook 1860592000 to the power unit using the special attachment brackets, then hoist the unit until it is under slight tension and remove the crossbar

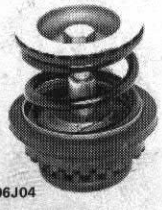
10.

– Disconnect the engine mounting from its anchor bracket

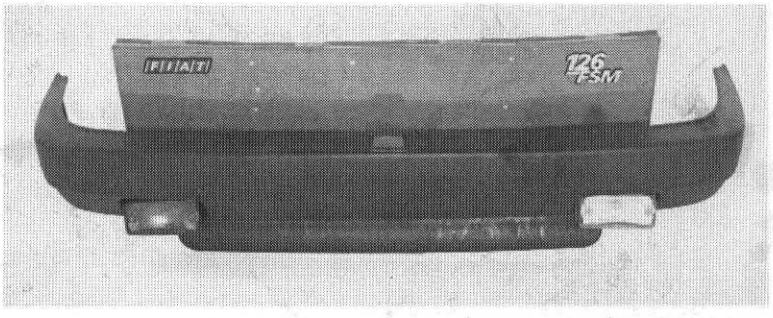




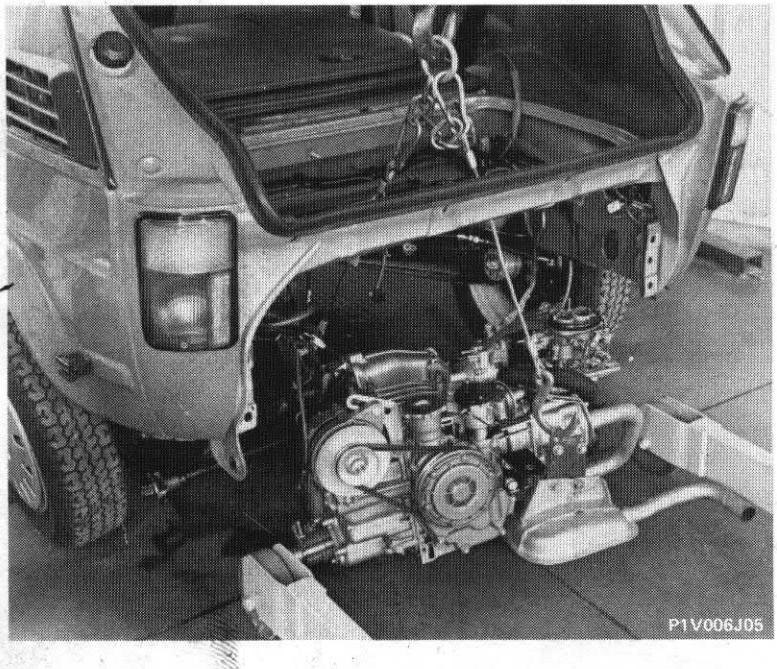




Engine mounting

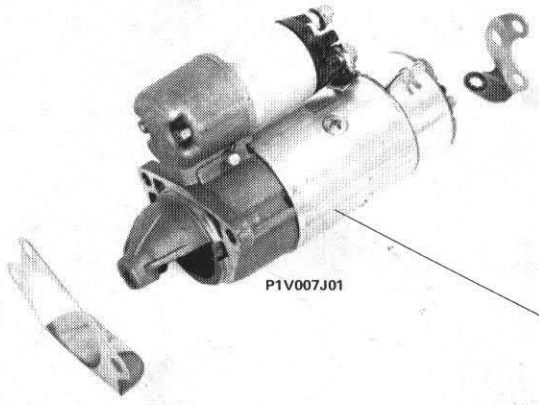


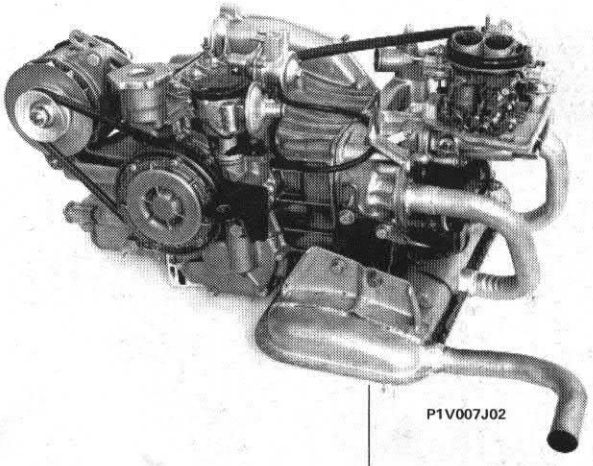
Rear valance complete with bumper and lights

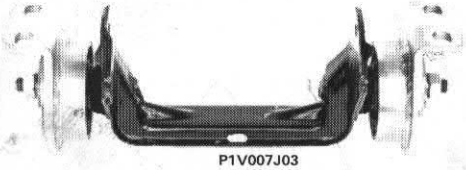


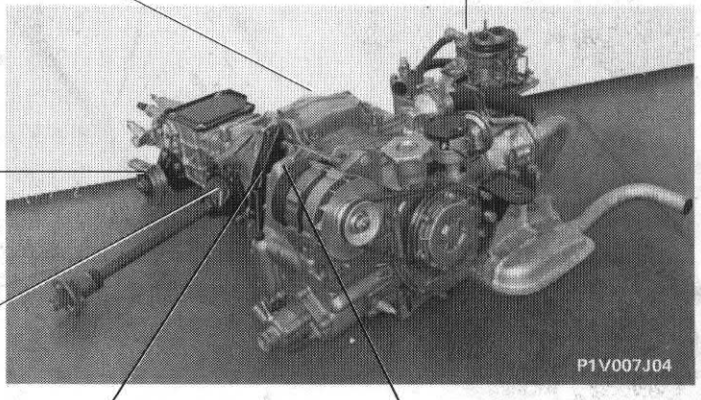
– Lower the power unit to the ground and unhook the hoist
– Raise the ramps and withdraw the power unit

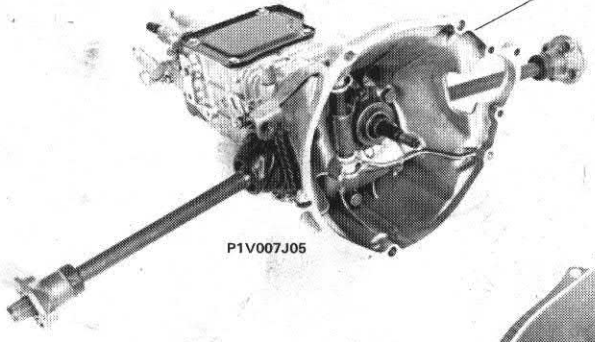
– rest the power unit on a platform and remove the following parts:

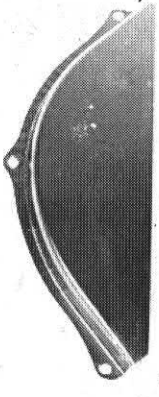

P1V007J01


P1V007J02


P1V007J03


P1V007J04


P1V007J05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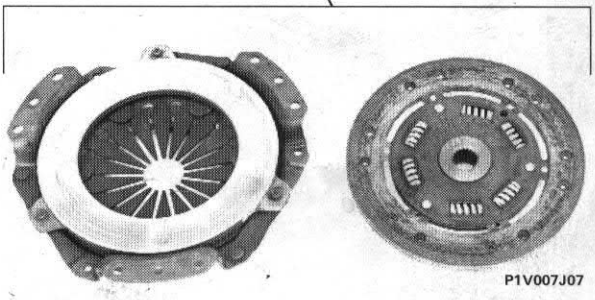
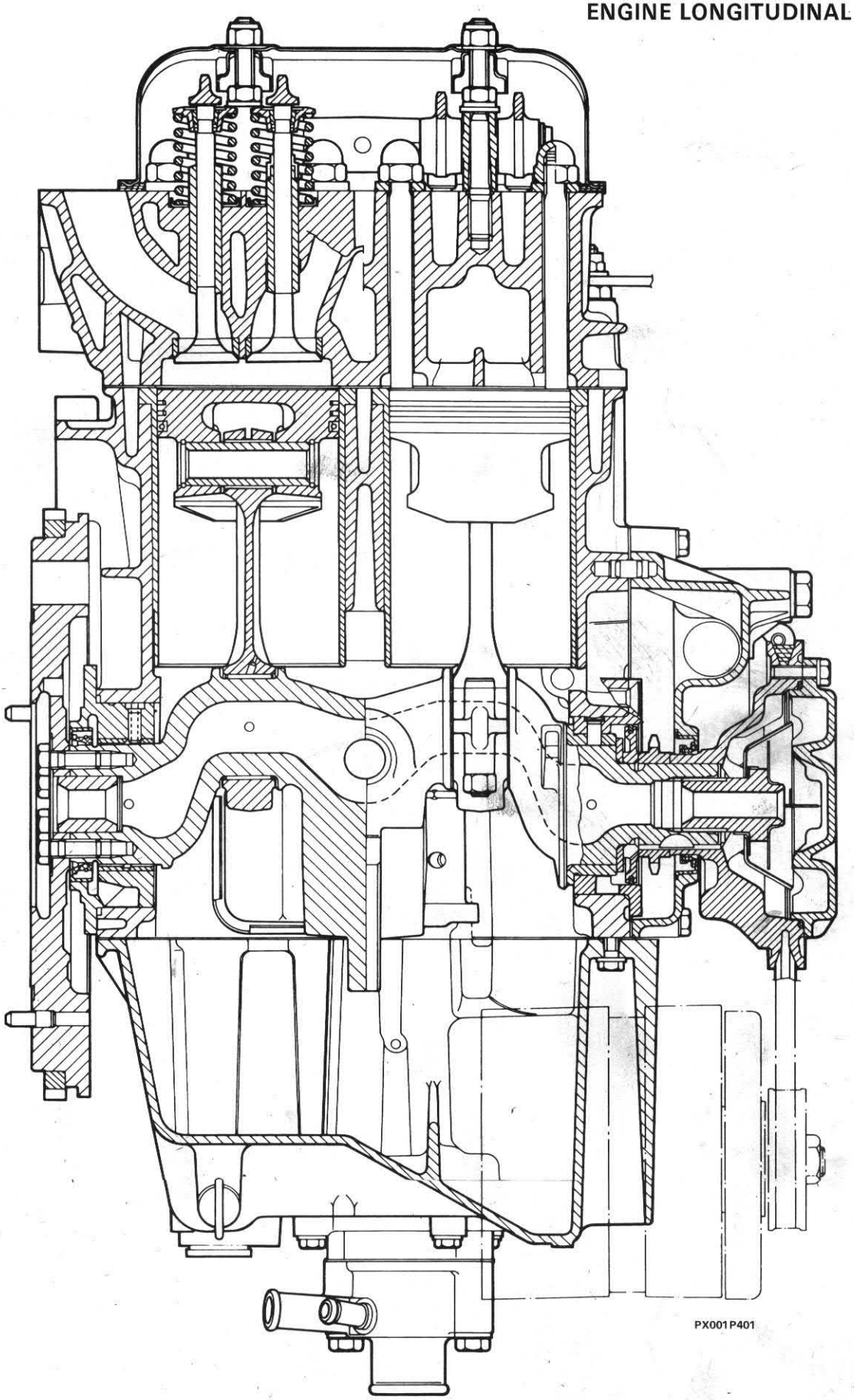

P1V007J07

NOTE *To refit the power unit, simply reverse the order of removal.*

Clutch pedal height

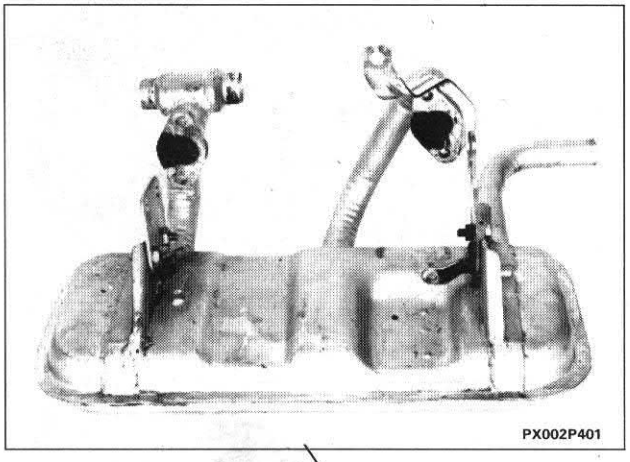
10.

ENGINE LONGITUDINAL SECTION

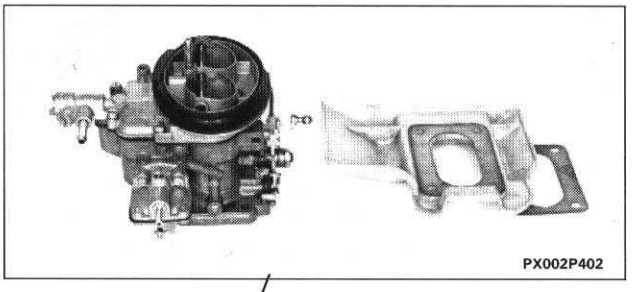


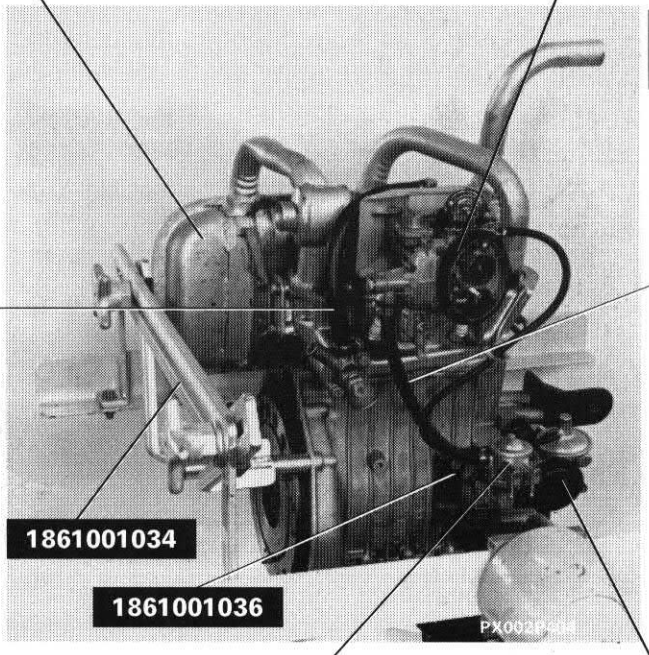
10.

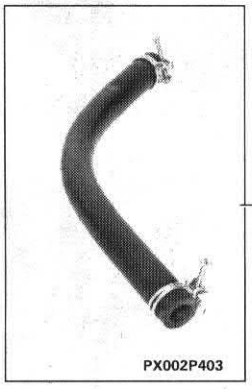
Exhaust manifold



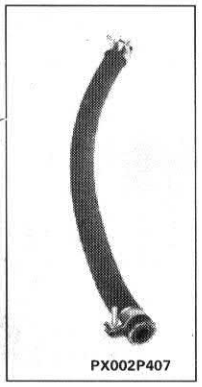
Weber 30 DGF 3/150 carburettor with gaskets and mount



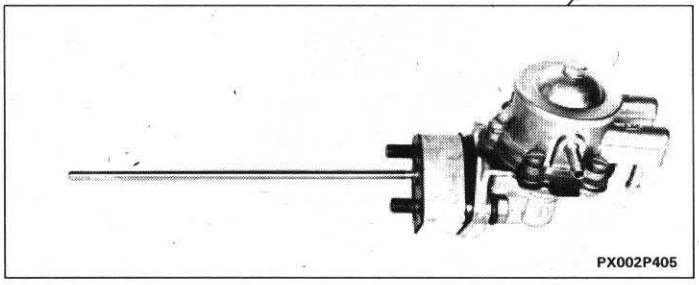




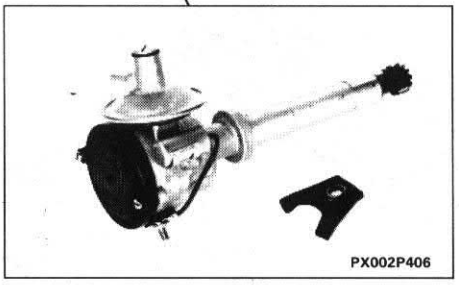
Engine coolant line connecting cylinder head fitting to exhaust manifold



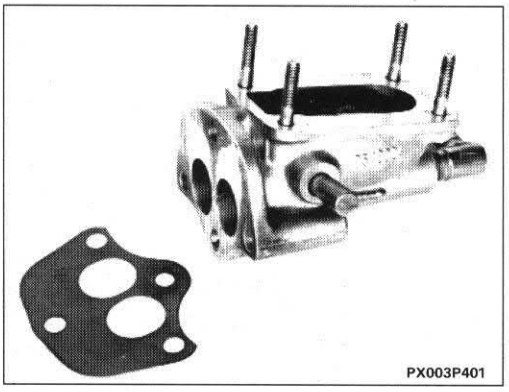
Fuel delivery line from pump to carburettor



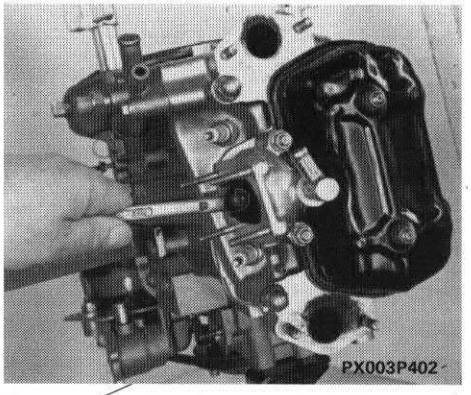
Fuel pump complete with seals, washers and control rod

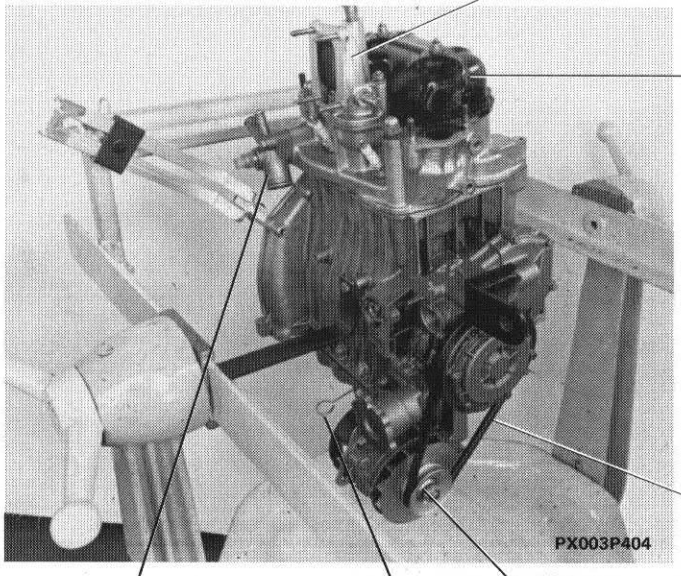


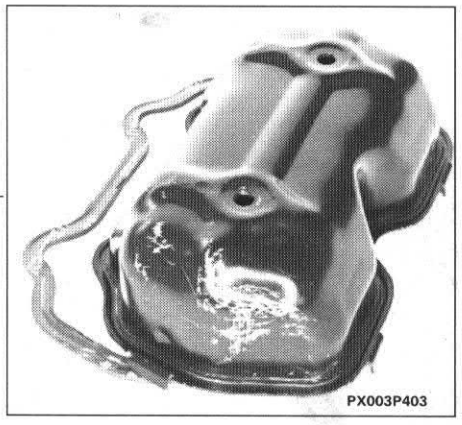
Ignition breaker



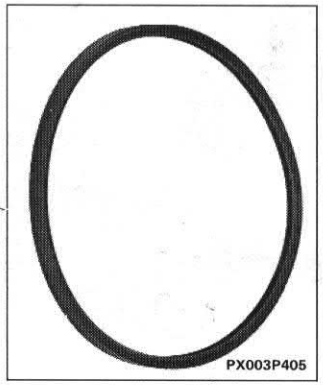
Intake manifold and gasket



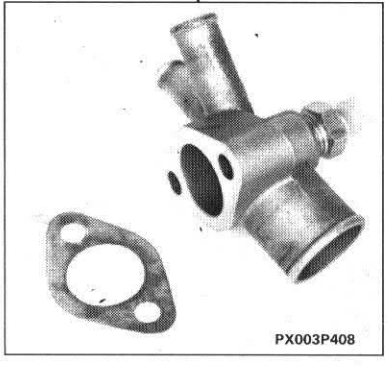




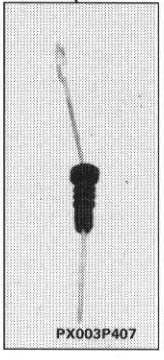
Tappet cover



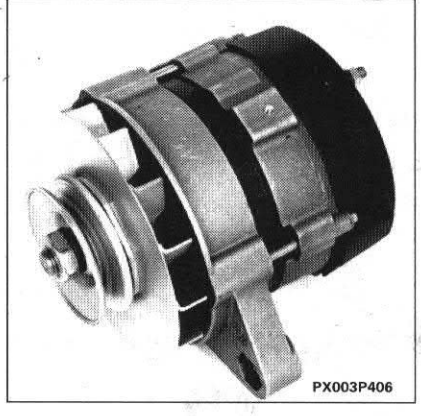
Alternator drive belt



Cylinder head fitting for coolant line attachment complete with temperature transmitter

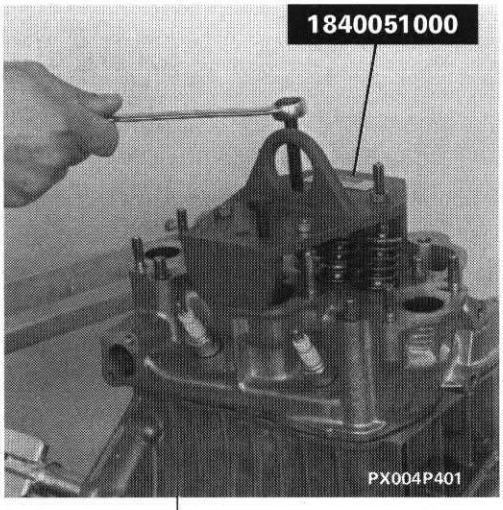


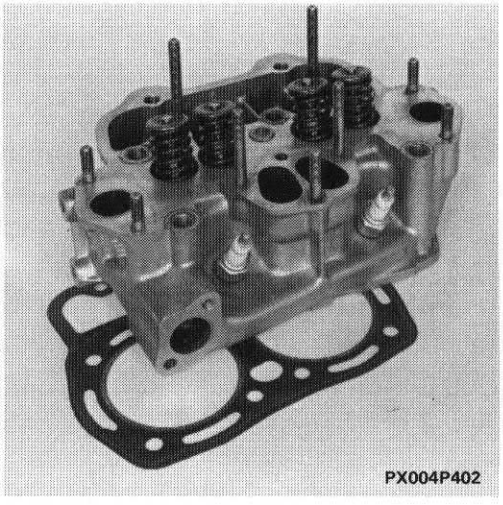
Oil level dipstick



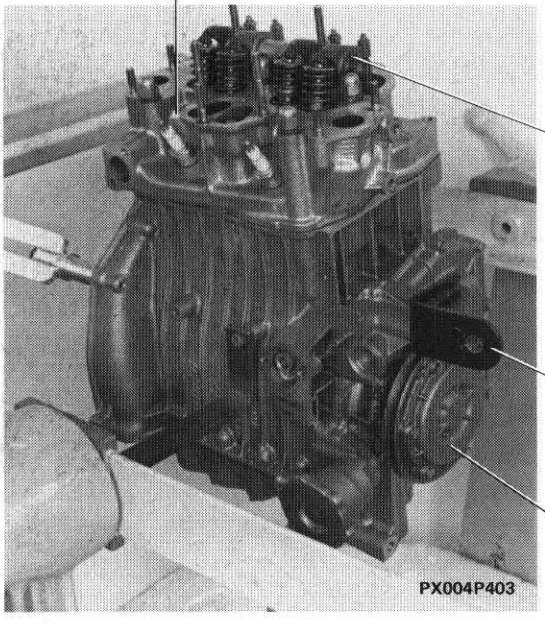
Alternator

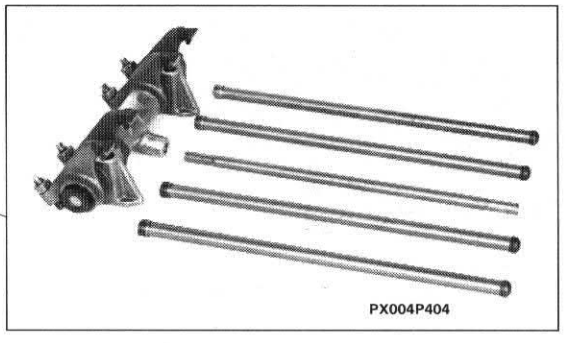
10.



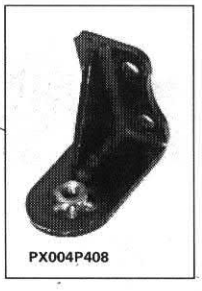


Cylinder head

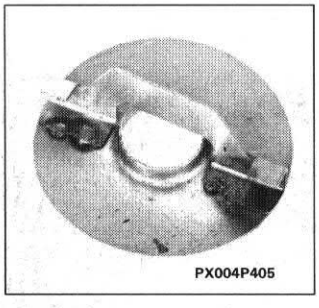




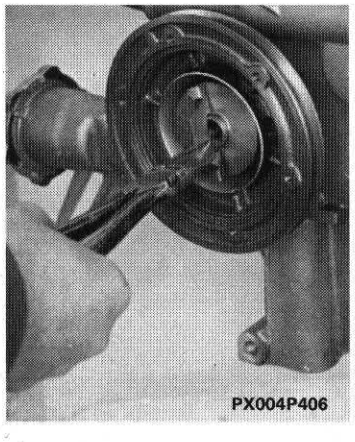
Rocker shaft and rods

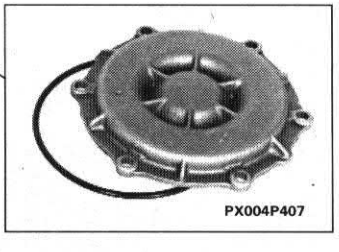


Engine bearing



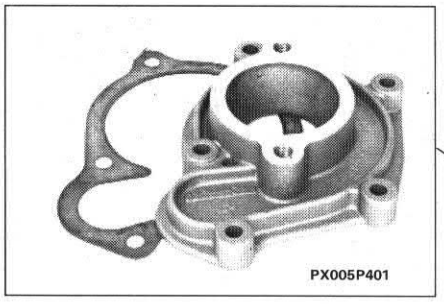
Deflector



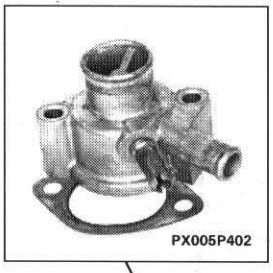


Centrifugal filter cover

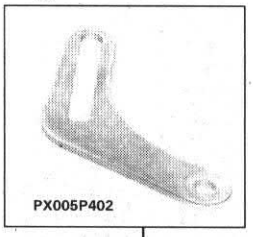
Coolant pump cover

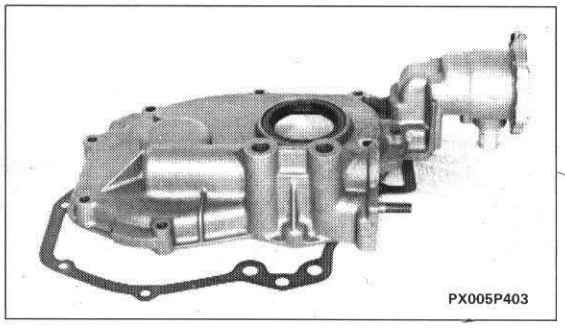


Thermostat

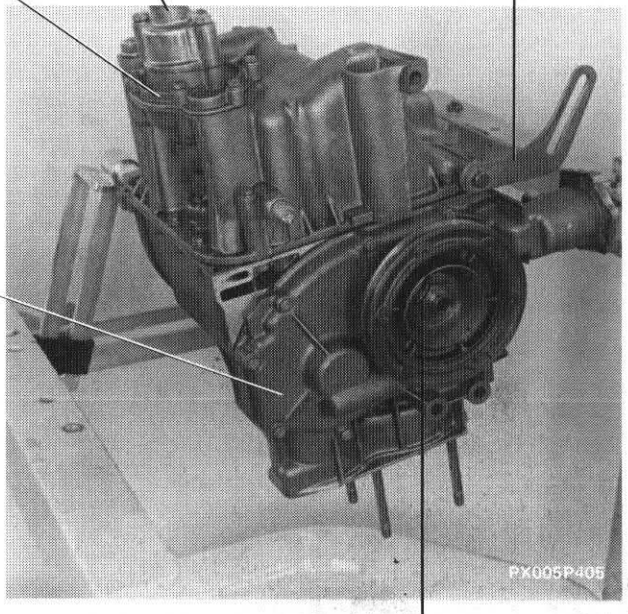


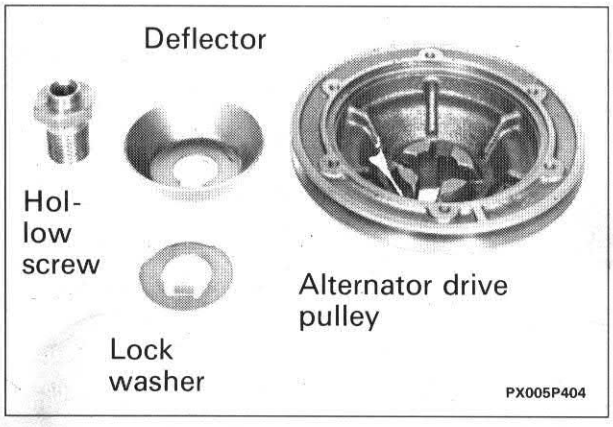
Bracket connecting alternator to engine block

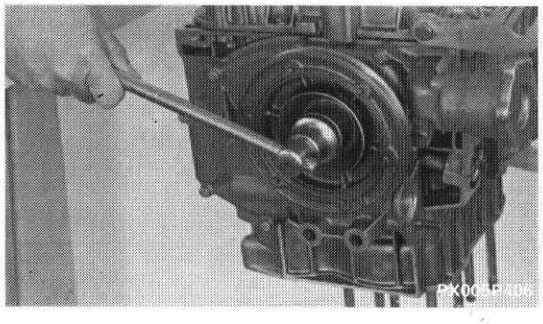


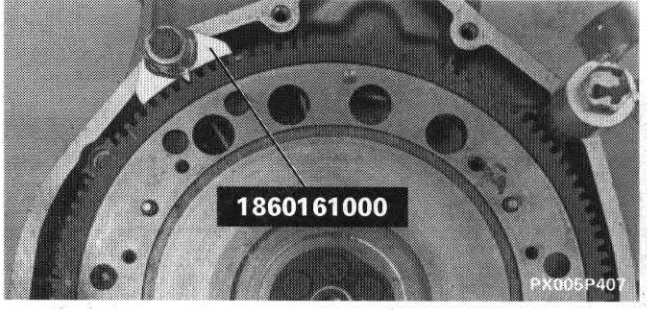


Timing cover



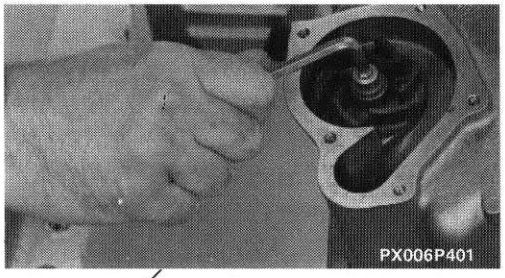


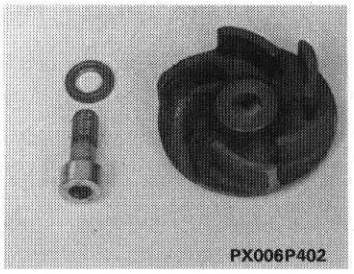




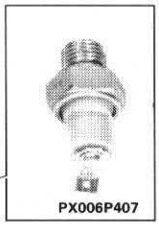
Lock flywheel in position to remove hollow screw

10.

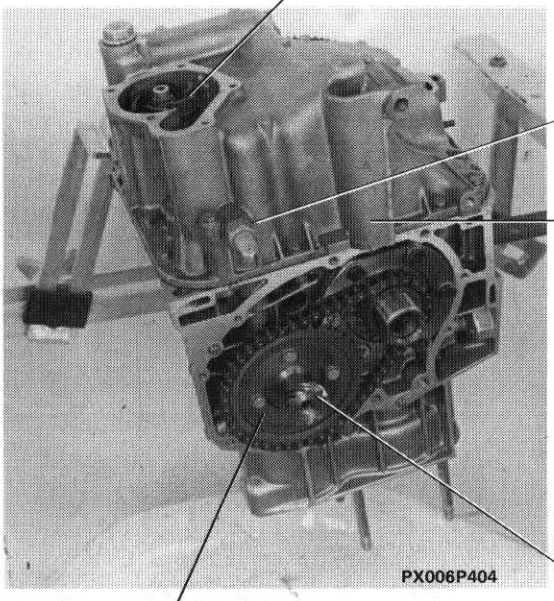


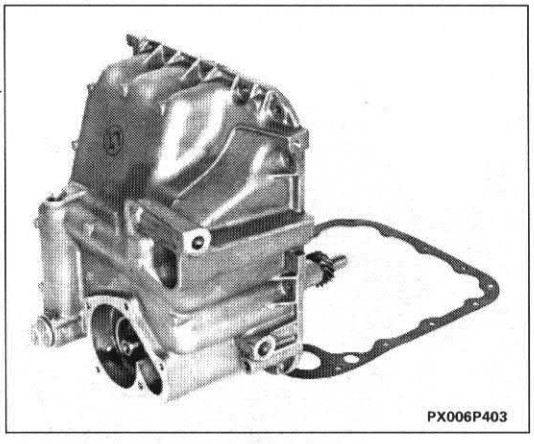


Coolant pump impeller

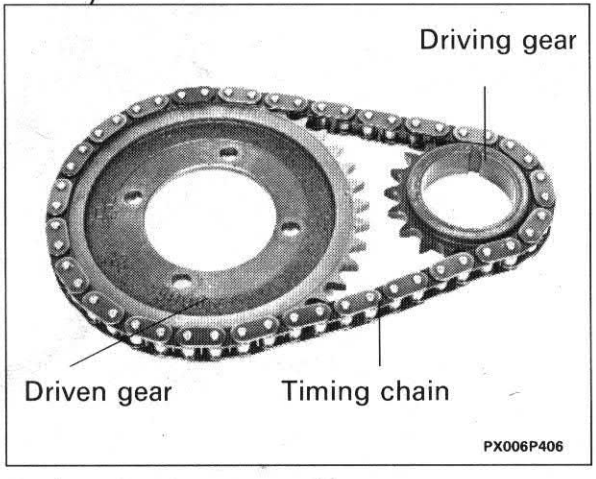


Low oil pressure transmitter

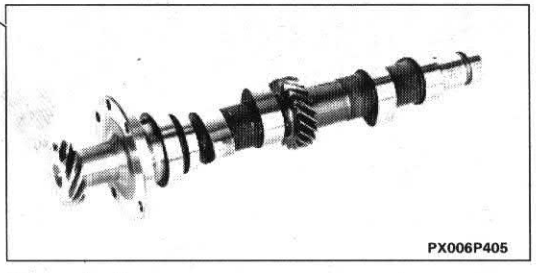




Oil sump complete with oil pump drive shaft, oil pump, coolant pump drive shaft and pump intake

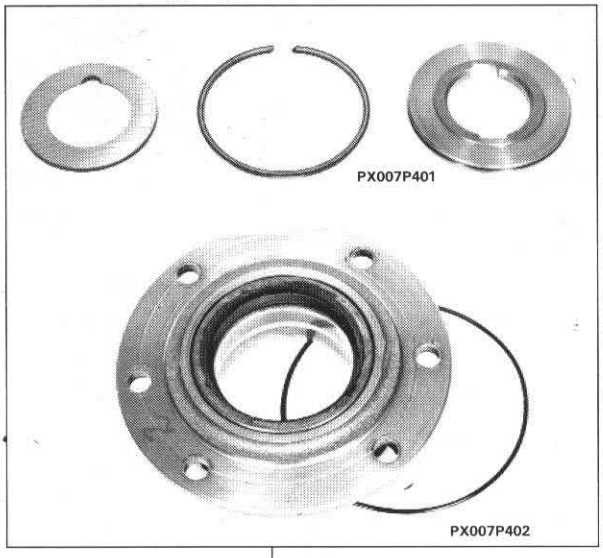


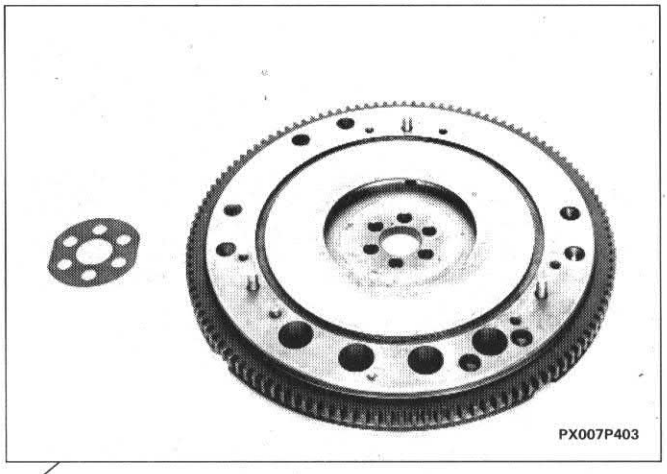
Camshaft drive



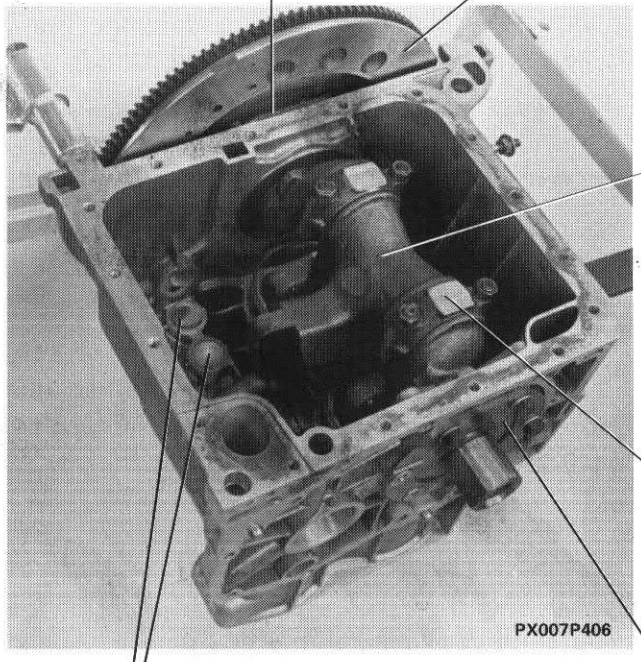
Camshaft

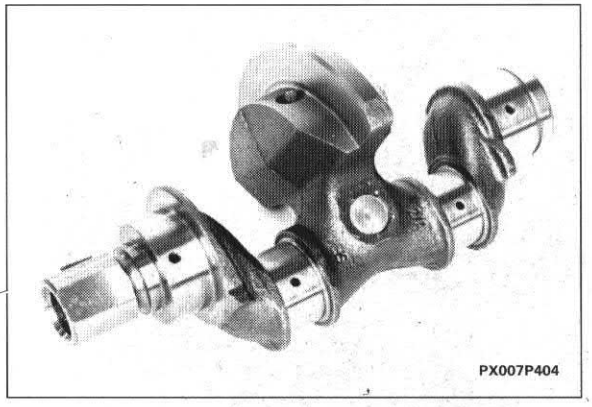
Main bearing, flywheel end



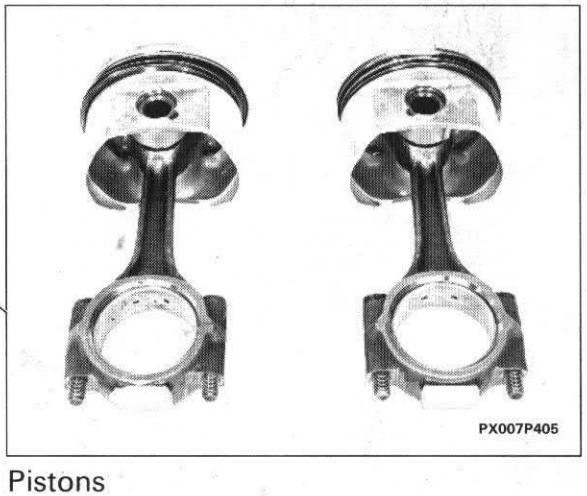


Flywheel

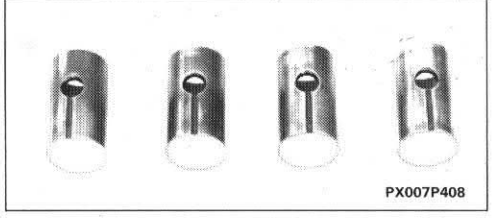




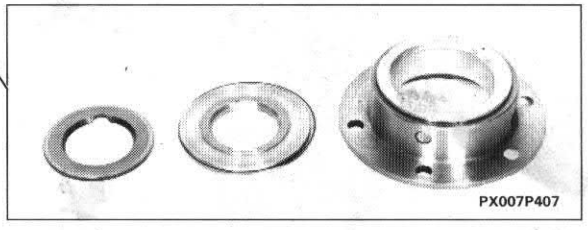
Drive shaft



Pistons

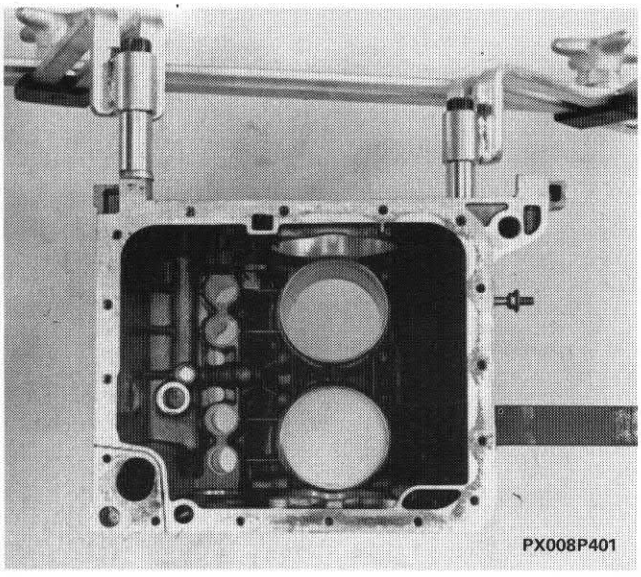


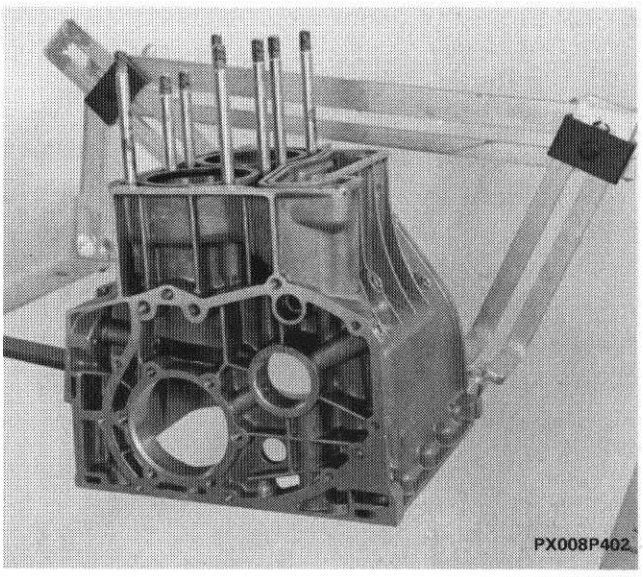
Tappets



Main bearing, camshaft end

10.

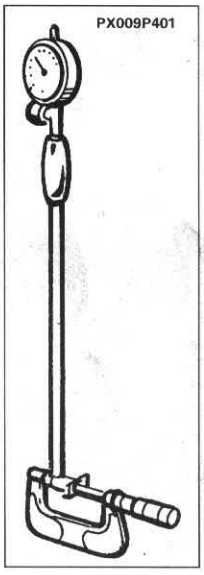


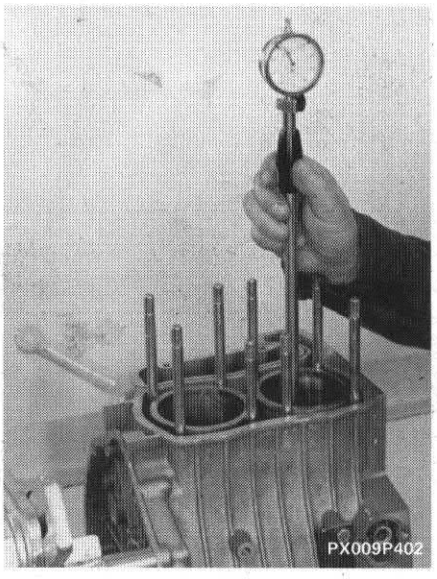


NOTE *Thoroughly check all parts once disassembly is complete.*
The following sections contain instructions for main checks and measurements necessary for determining whether components can be reused.
Proper assembly sequences and procedures are shown in addition to tools for engine assembly.

CYLINDER LINERS

80,000 ÷ 80,030

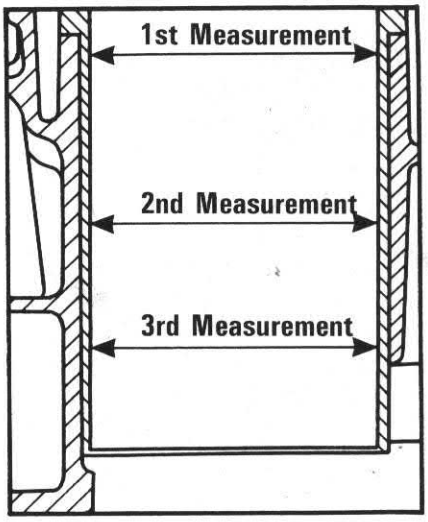


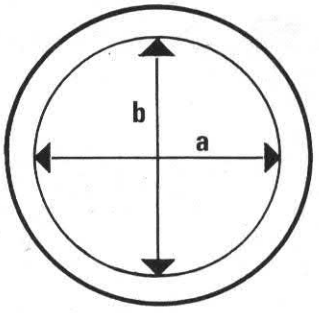


Cylinder liners are bonded to engine block with LOCTITE 640.

Cylinder liner measurement check and diagram

Measure maximum cylinder liner ovalisation, taper and wear values
Visually inspect all sliding surfaces



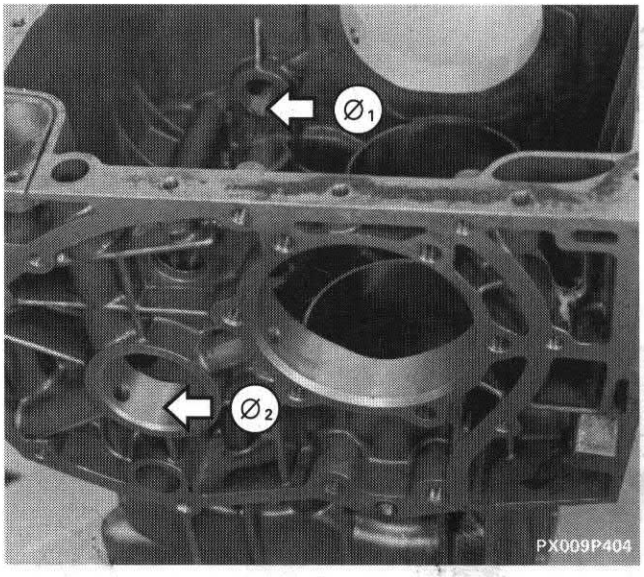


NOTE *Permitted tolerances are: taper - difference between 1st and 3rd measurement: ± 0.005 mm; ovalisation - difference between a and b: ± 0.05 mm.*

Replacement cylinder liners are not supplied individually. If one cylinder liner is defective, the entire engine block must be replaced

ENGINE BLOCK

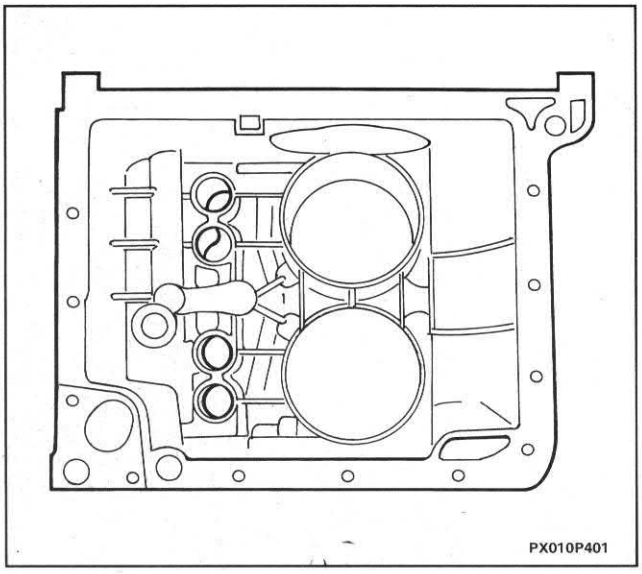
$\varnothing_1$	22,015 ÷ 22,036
$\varnothing_2$	43,020 ÷ 43,045



Camshaft seat check

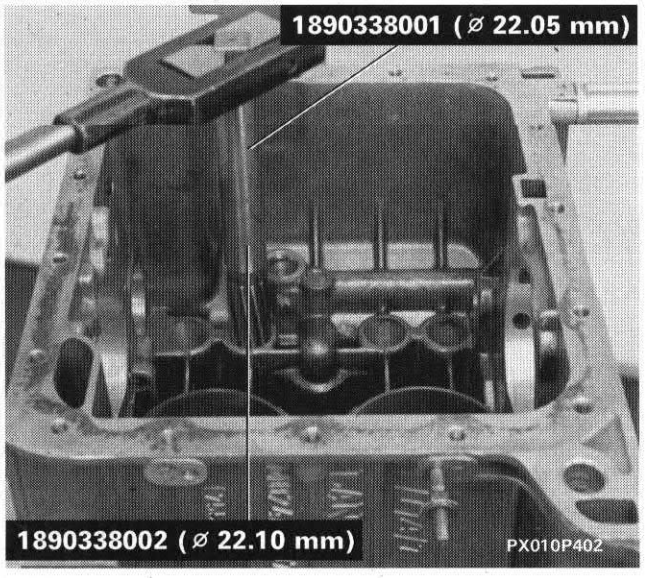
NOTE *Internal surfaces must be smooth and unscored*
Use an internal gauge to test for wear
The engine block should be replaced if significant defects are found

10.

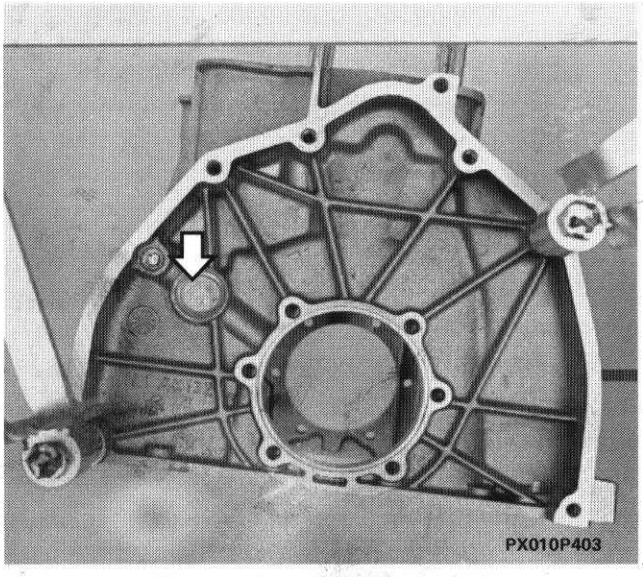


Tappet seat check

Measure amount of wear. Remember that replacement tappets can be supplied with diameters increased by 0.05 and 0.10 mm



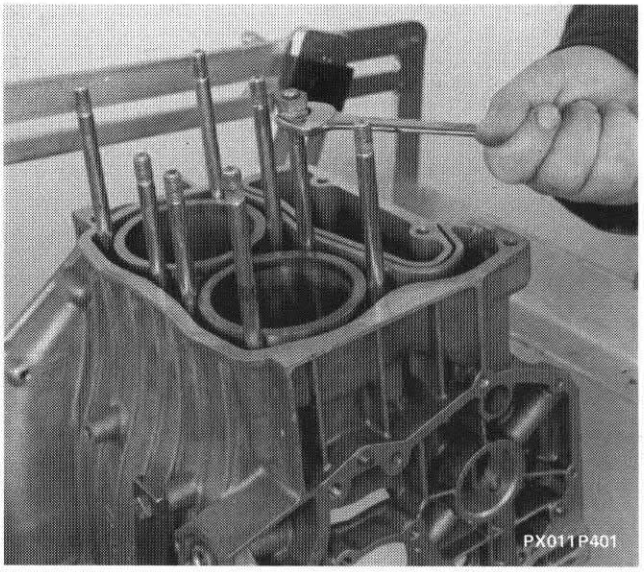
Bore seats to fit larger tappets



Check engine block caps

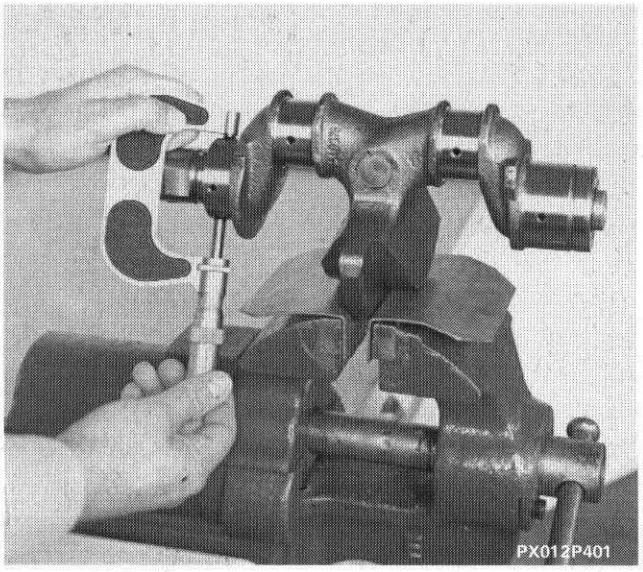
Check that caps are oil tight. Replace any caps found to be defective.

Spread sealant on engine block contact surfaces before fitting caps



Stud removal - assembly

10.



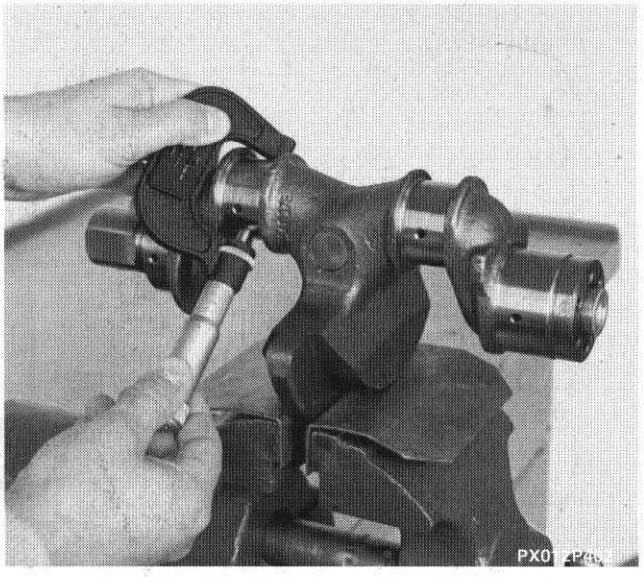
CRANKSHAFT

$\varnothing_1$	53,970 ÷ 53,980
$\varnothing_2$	53,980 ÷ 53,990

Journal measurement

Diminution classes are: 0.2 - 0.4 - 0.6 - 0.8 - 1.00 mm.

NOTE *Check journal and crank pin diameters. If measurements exceed permitted tolerances, grind to correct diameter.*

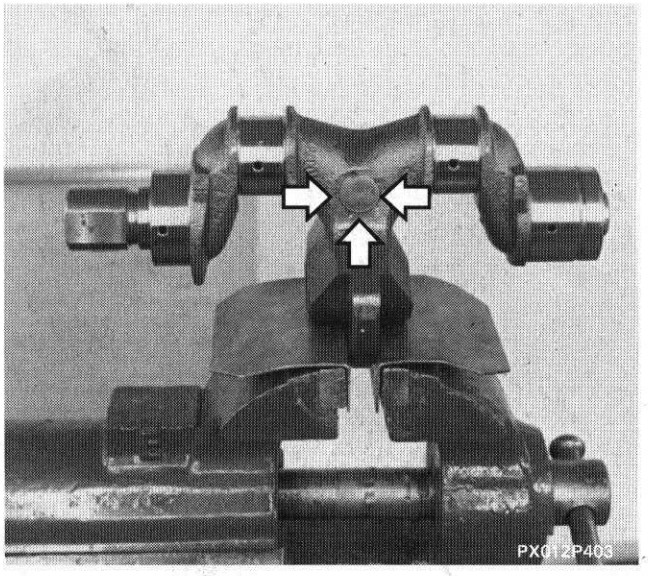


44,000 ÷ 44,020

Crank pin measurement

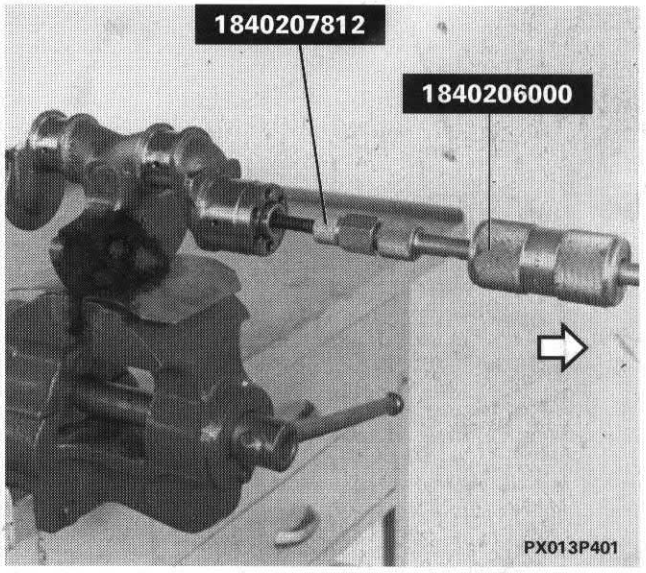
Diminution classes are: 0.254 - 0.508 mm.

Clean lubrication ports thoroughly with petrol before grinding pins and journals.



Cap closure

Squeeze caps closed at points arrowed.

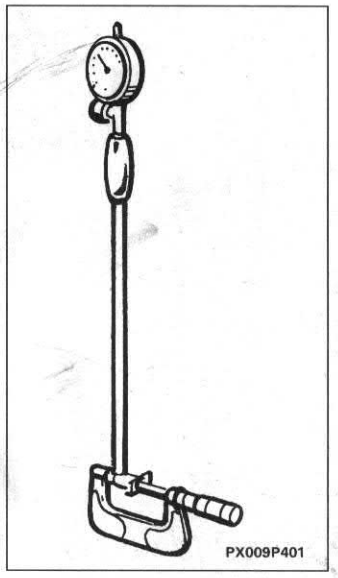


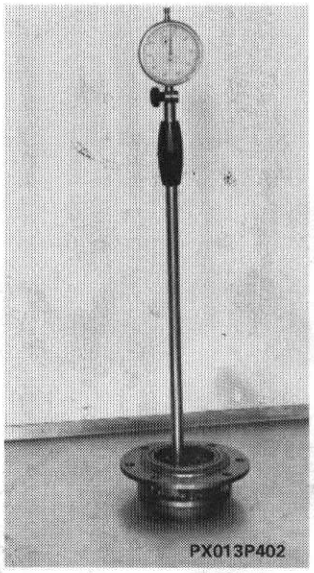
Disassembly of clutch shaft centring bushing

The bushing may be fitted using an ordinary driver

MAIN BEARINGS

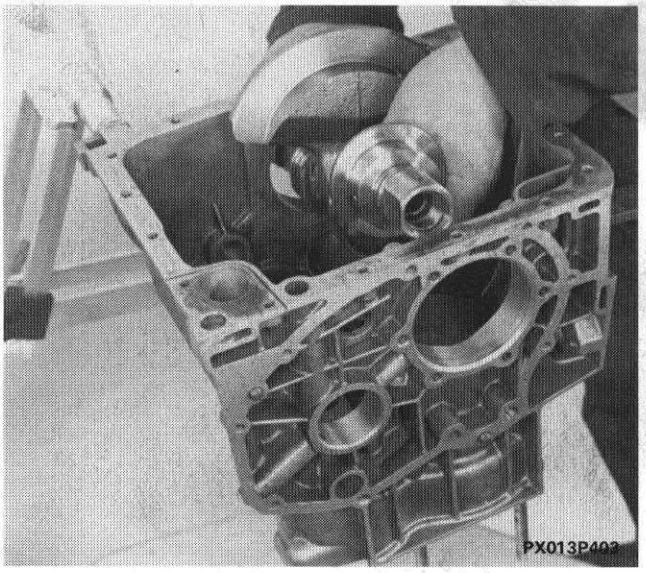
$\varnothing_1$	54,010 ÷ 54,025
$\varnothing_2$	54,020 ÷ 54,035





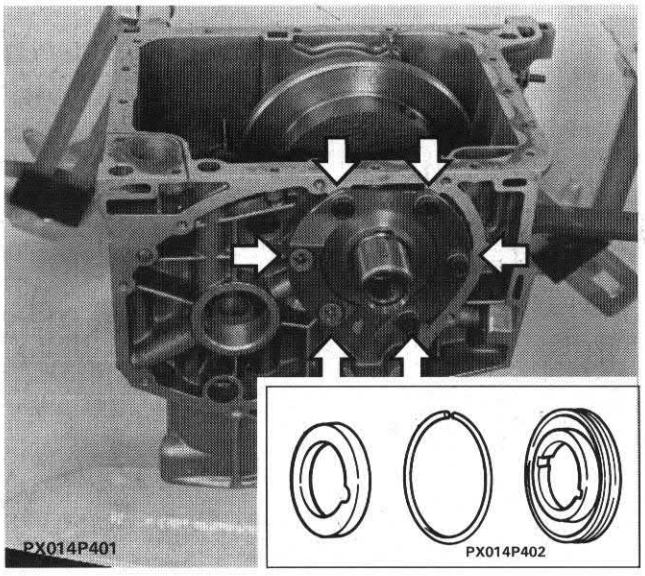
Main bearing measurement

Diminution categories are as follows: 0.2 - 0.4 - 0.6 - 0.8 - 1.0 mm.



Drive shaft assembly

10.

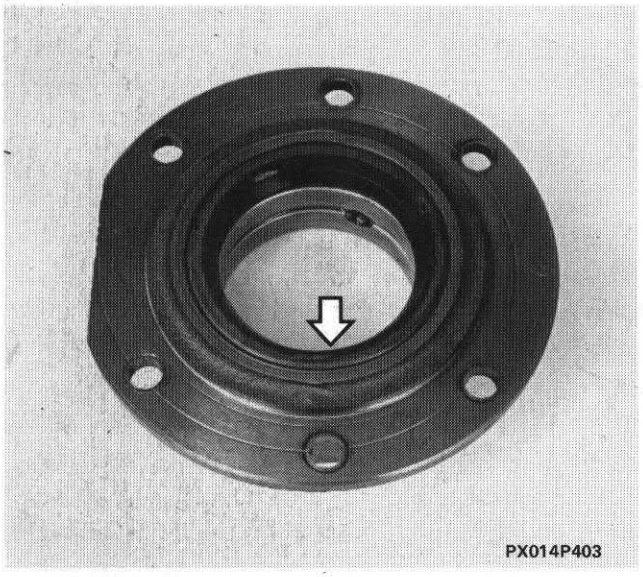


2,7 daNm

Assembly of crankshaft end main bearings and oil seal

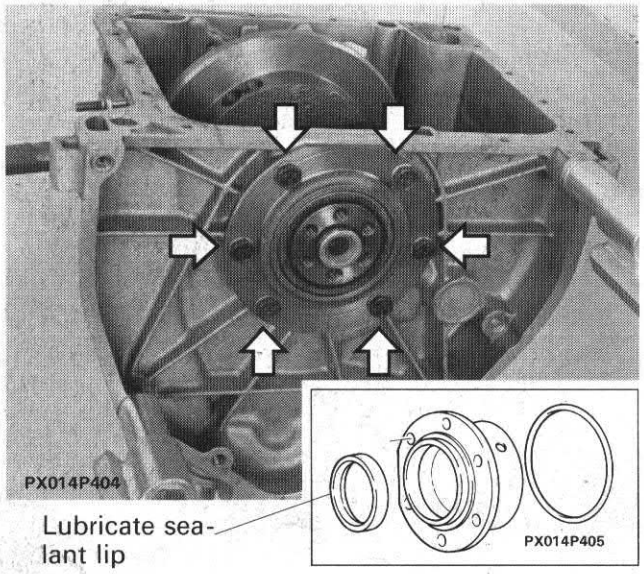
The arrows indicate screws to be tightened in pairs

Components prior to final installation with engine oil



Installation of seal on main bearing, flywheel end

An ordinary driver may be used for installation and removal operations



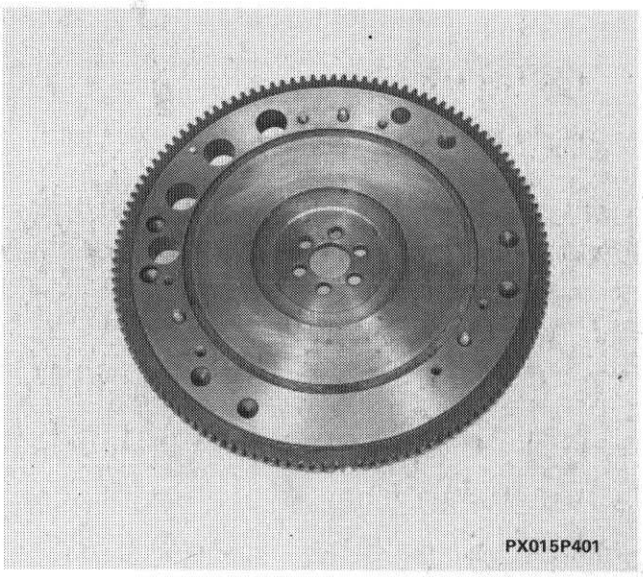
2,7 daNm

Installation of main bearing, flywheel end

The arrows indicate screws to be tightened in pairs

Components prior to final assembly with engine oil

FLYWHEEL

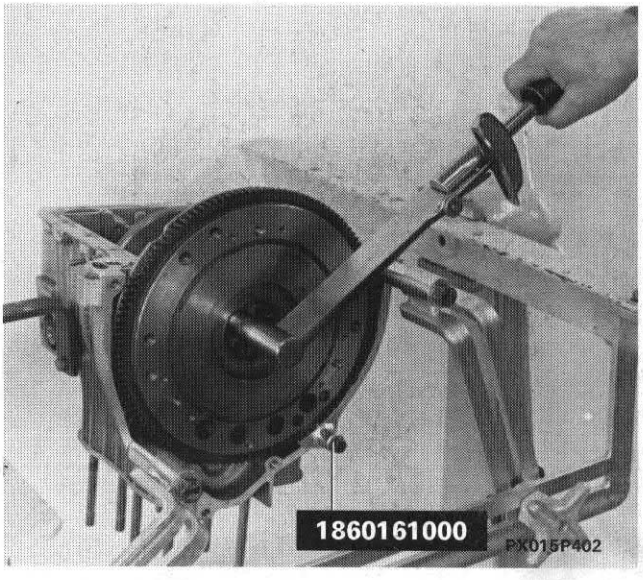


Check clutch plate seat

Face surface if scoring is present

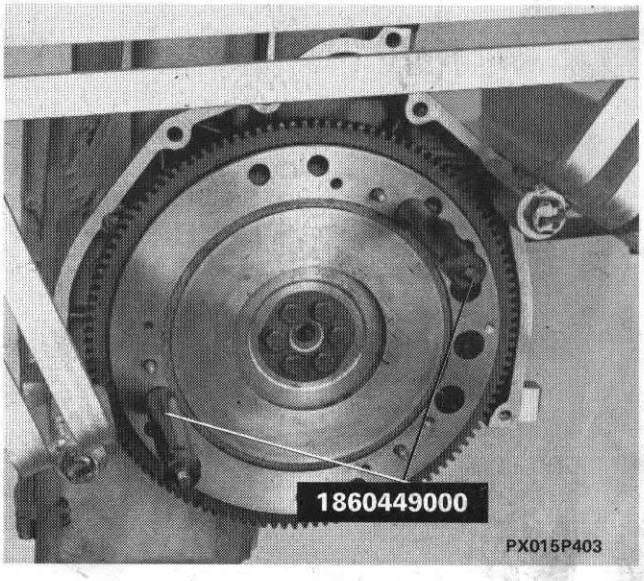
NOTE *If the crown wheel is to be replaced, first heat the new crown wheel to 80°C in an oven, then fit on flywheel with inside beveled edge facing the flywheel*
Use an ordinary steel driver for assembly

4,4 daNm



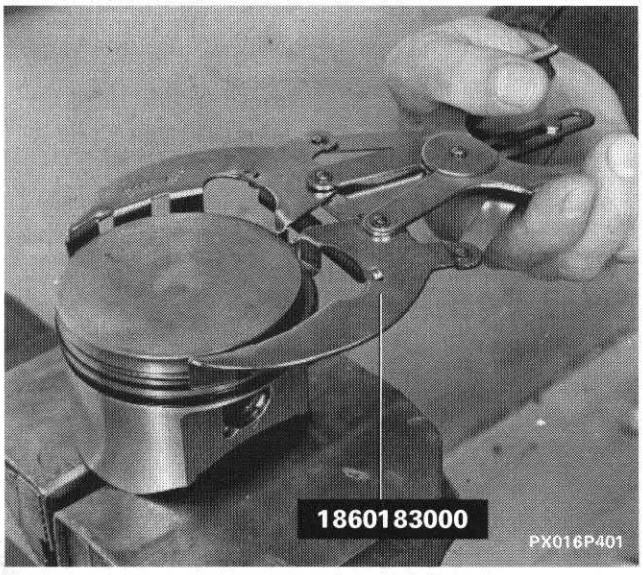
Flywheel assembly

NOTE *Postion driveshaft with crankpins facing upwards (T.D.C.), then fit flywheel with reference notch, indicating T.D.C., facing upward.*



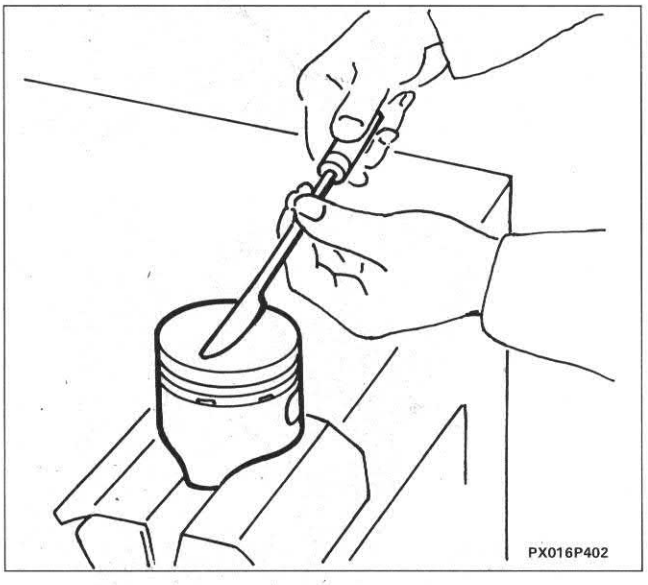
Installation of threaded dowels for drive shaft positioning

10.

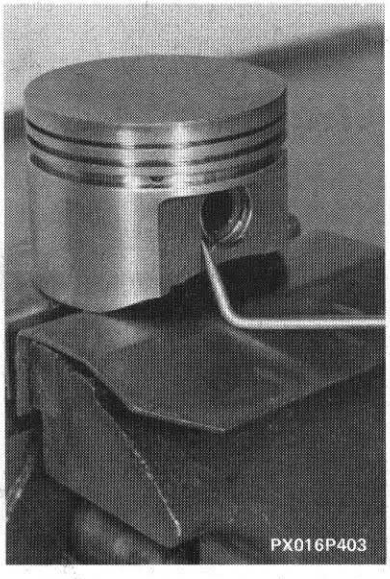


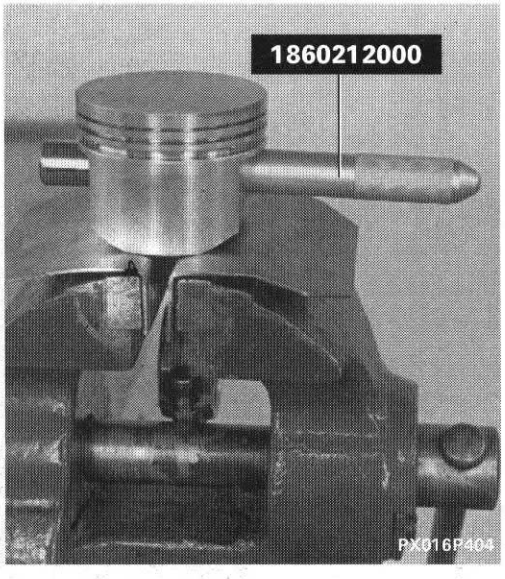
CON ROD - PISTON ASSEMBLY

Piston ring disassembly



Piston crown cleaning





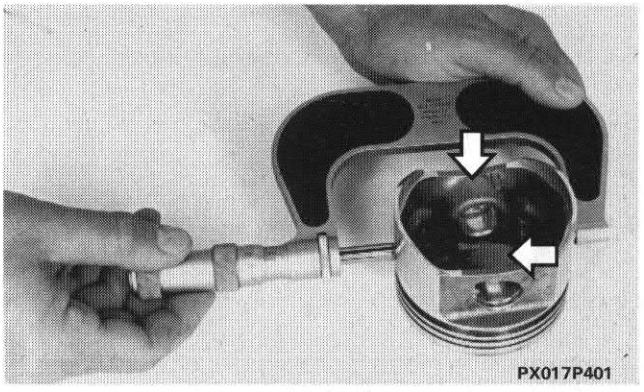
Gudgeon pin retaining ring disassembly

Gudgeon pin disassembly

NOTE *Parts may be re-used if found to be free of wear. Care must be taken, however, to mark parts from the same unit.*

PISTONS

A	79,950 ÷ 79,960
C	79,960 ÷ 79,970
E	79,970 ÷ 79,980


PX017P401

Measurement of piston diameter

- **Standard:** nominal measurements selected in five 0.01 mm categories

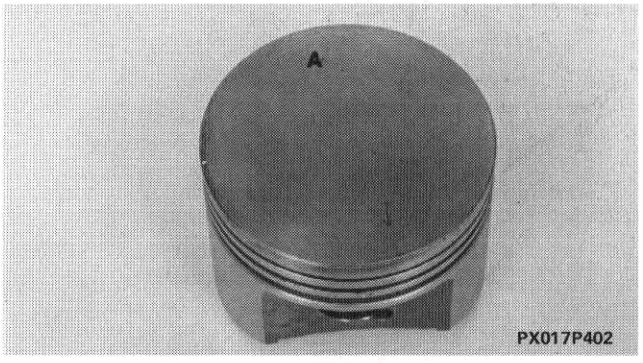
  A - B - C - D - E

  spares only A - C - E
- **Oversized:** 0.4 mm

  without selection of diameter and category on pin hub hole.

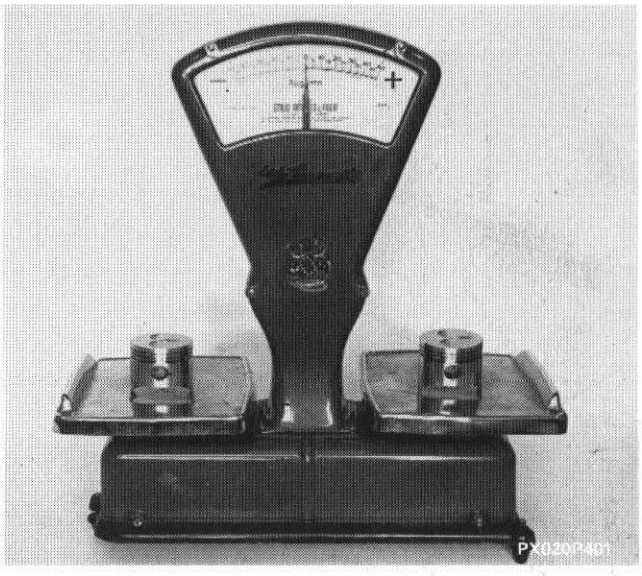
NOTE *The arrows indicate areas from which excess material must be removed to obtain equal weights.*

A = Letter indicating piston category



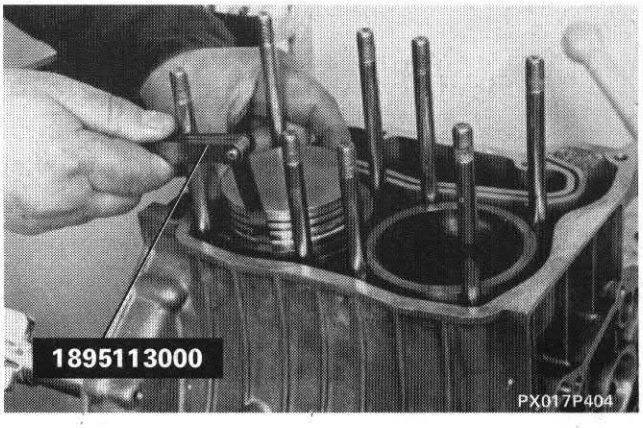
PX017P402

± 5 g.


PX020P401

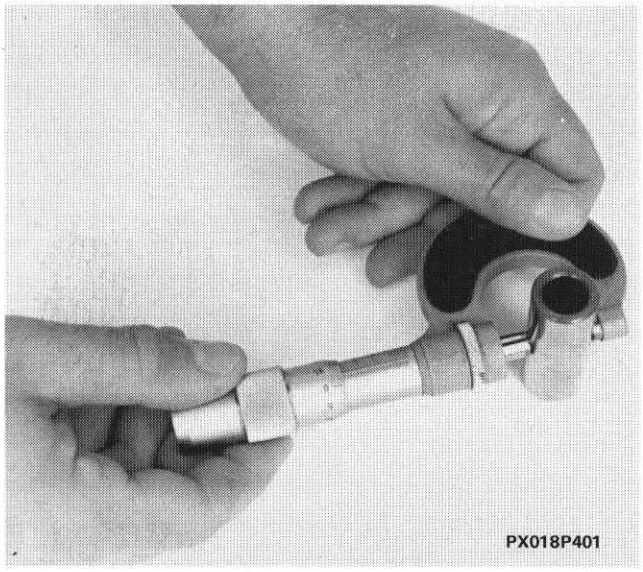
Check piston weight meets specifications

0,040 ÷ 0,060



PX017P404

Check piston and cylinder liner mating clearance

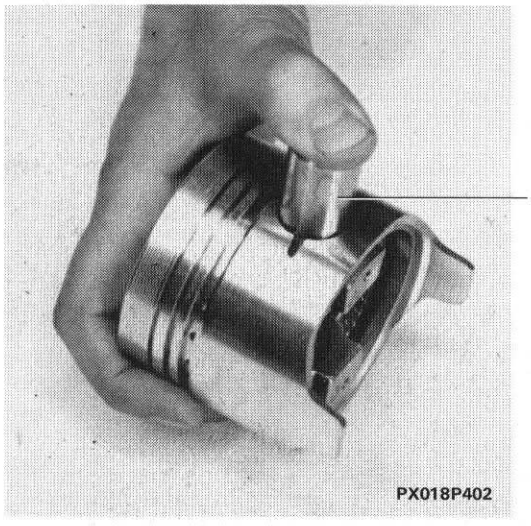


GUDGEON PINS

19,990 ÷ 19,994	

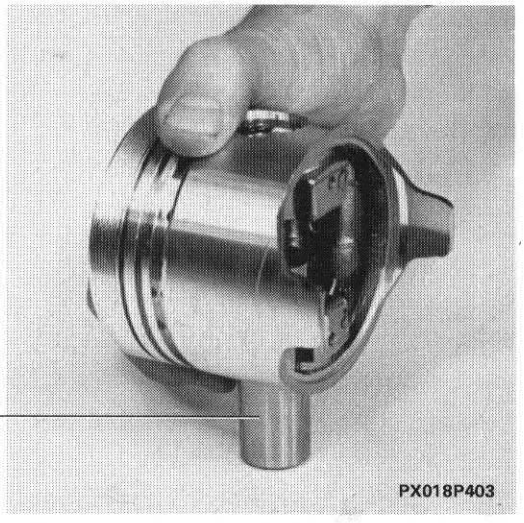
Gudgeon pin diameter measurement

Pins are supplied as standard spares

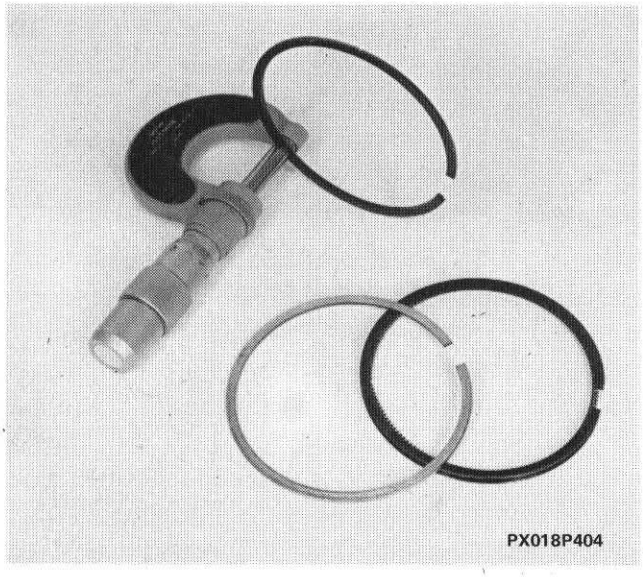


It should be possible to press-fit pin normally

Pin should not tend to slip out of hub



Conditions for proper pin-piston mating

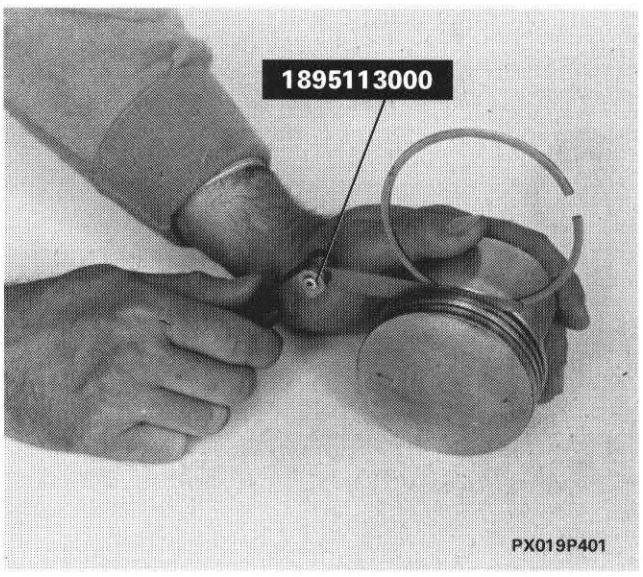


PISTON RINGS

1	1,478 ÷ 1,490
2	1,978 ÷ 1,990
3	3,925 ÷ 3,937

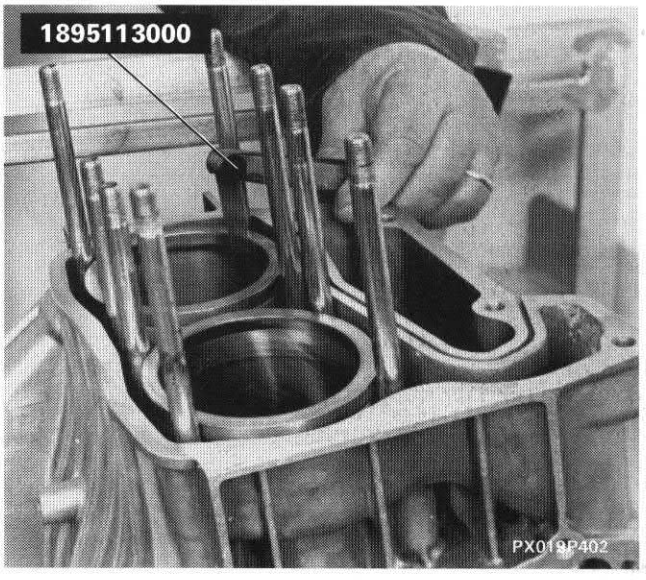
Piston pin thickness measurement

1	0,045 ÷ 0,077
2	0,040 ÷ 0,072
3	0,030 ÷ 0,062

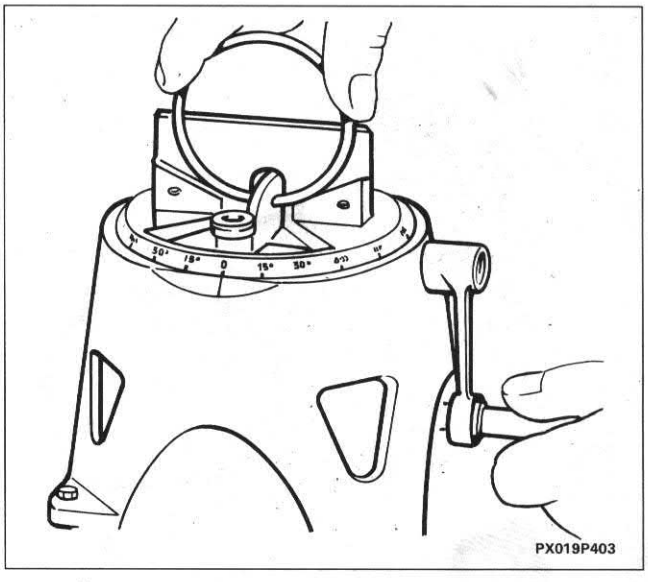


Check mating clearance between piston rings and piston crown

1	0,30 ÷ 0,45
2	0,20 ÷ 0,35
3	0,20 ÷ 0,35



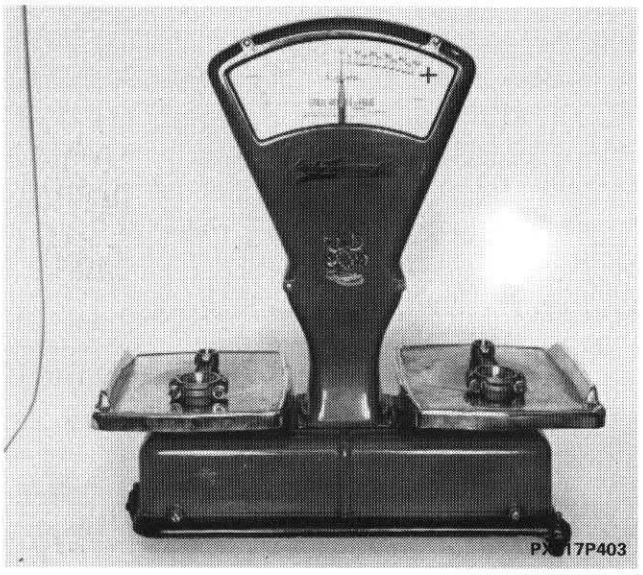
Check and measure clearance between ends of piston rings



Dress ends of piston rings

Piston rings are also supplied oversized by 0.4 mm.

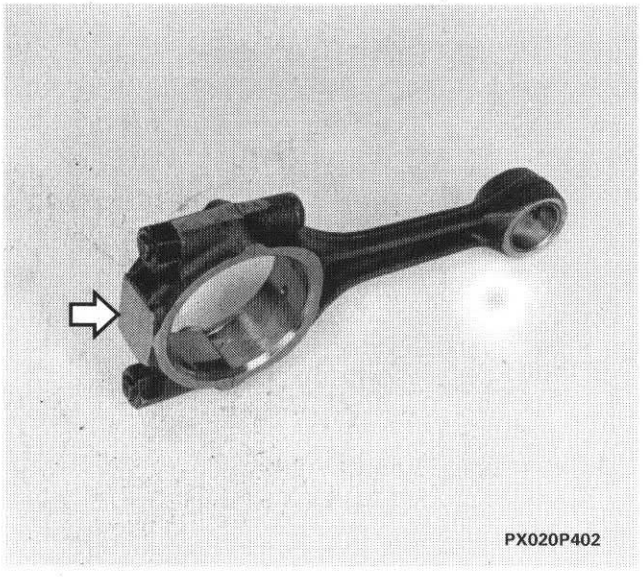
10.



CON RODS

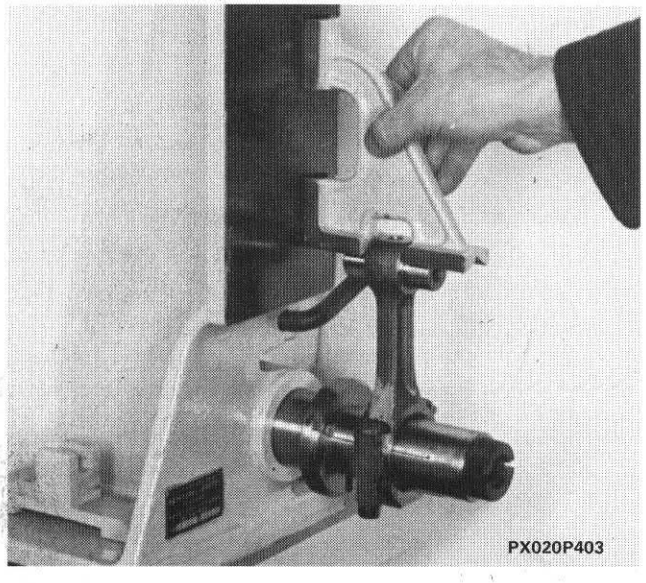
Check con rods are equal in weight

If con rods are replaced, the relevant cylinder number must be stamped on the half bearing seat.

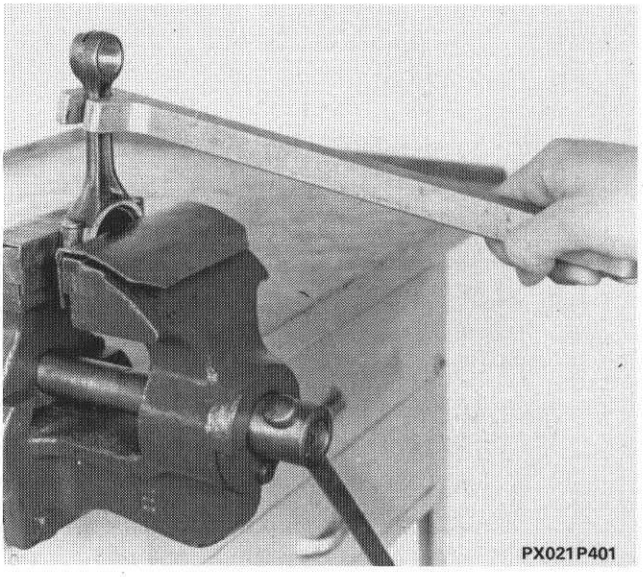


Area from where material may be removed

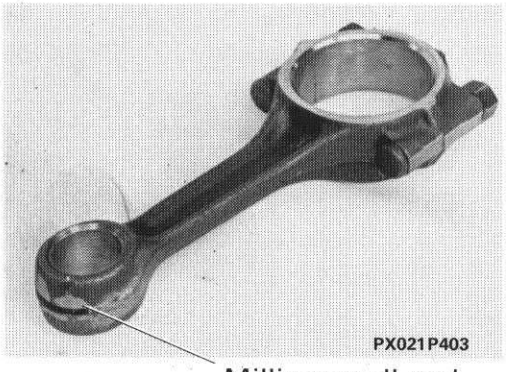
The arrow indicates the area from where material must be removed to balance weights, according to type of con rod.



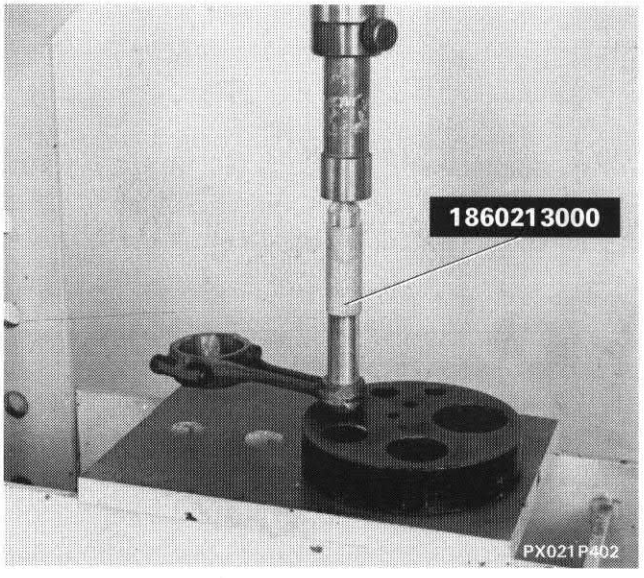
Check con rod alignment



Connecting rod alignment



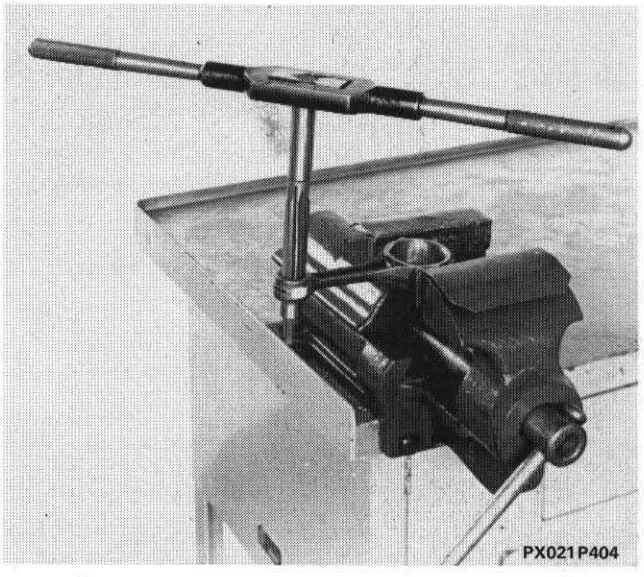
Milling small end



Removal-installation on small end

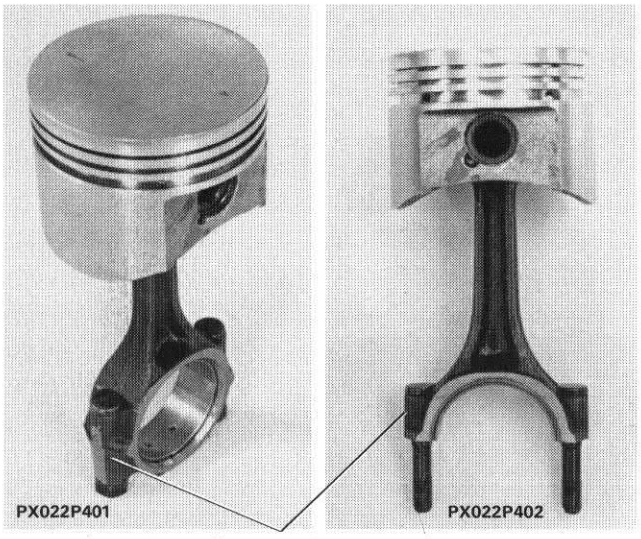
Before dressing the bushing, make a notch on the old bushing at the point of the milling on the small end.

20,000 ÷ 20,006



Dressing of bushing press-fitted to small end

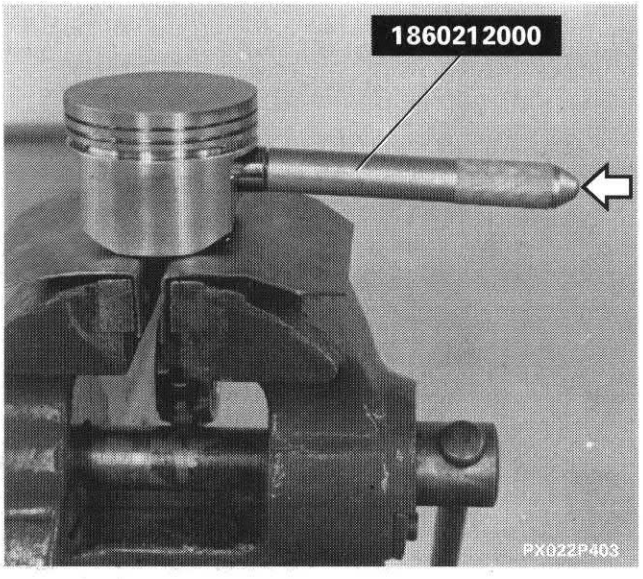
10.



Con rod cylinder number

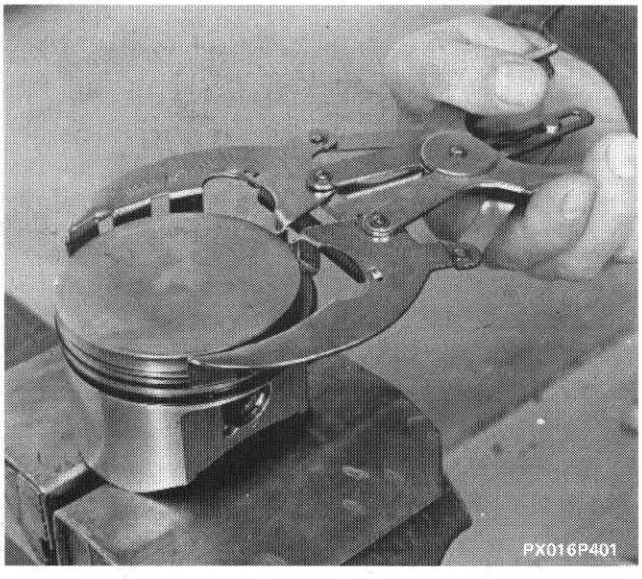
Con rod - piston assembly diagram

If the con rod is replaced, the relevant cylinder number must be stamped on the half bearing seats.



Fit pin to con rod - piston assembly

Lock gudgeon pin in seat with retaining ring.



Fit and position rings on pistons

Fit piston rings with wording "TOP" uppermost.
Following assembly, position piston ring ends so that they do not coincide with the pin centre line and are staggered by about 120°

Installation of con rod half bearings

NOTE *Spare con rod bearings are supplied with inside diameter decreased by 0.254 - 0.508 mm.*

Do not try to adapt half bearings. Replace component if signs of scoring or binding are found.
Clean parts thoroughly before installation.

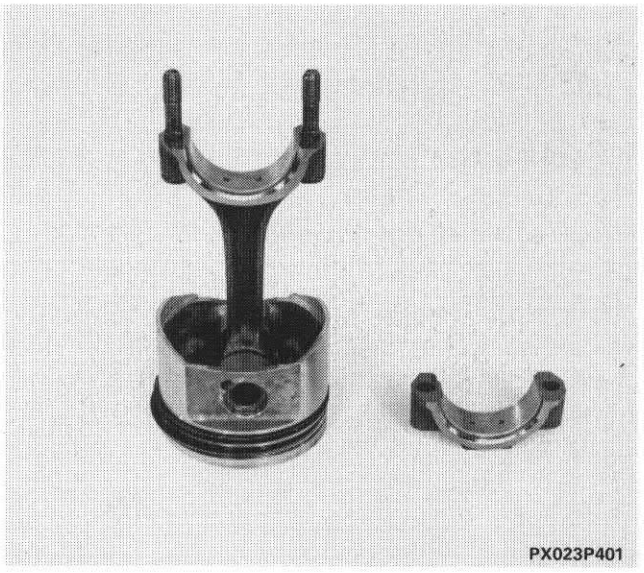
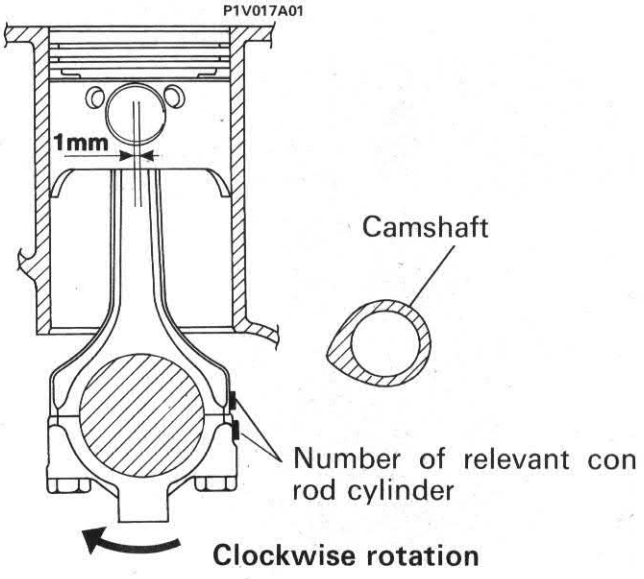


Diagram showing proper installation of con rod - piston assembly in cylinder liner

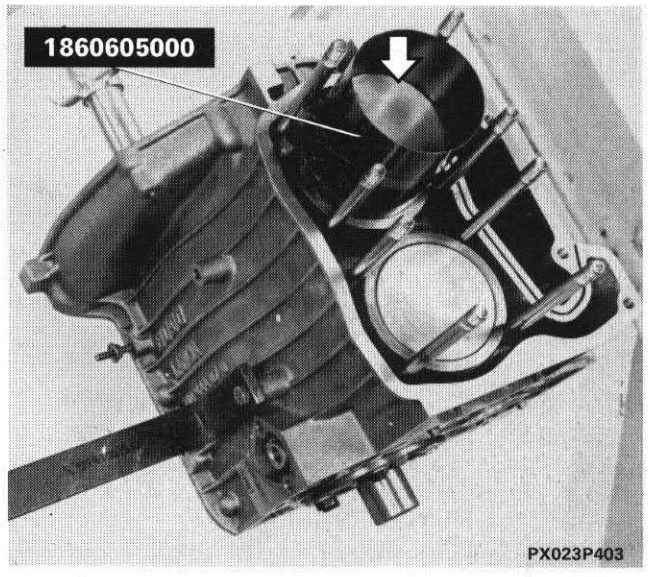
The arrow shows the direction of rotation of the engine from the camshaft end.

When installing the con rod - piston assembly, check that the number of the relevant con rod is turned towards the camshaft.

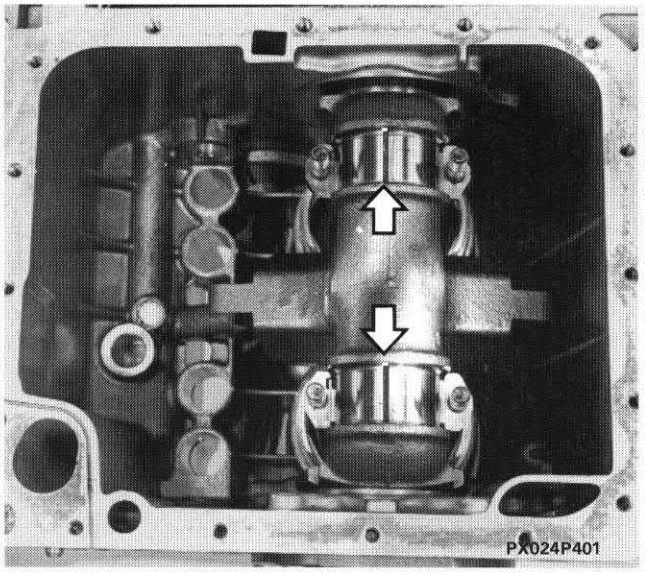


Install con rod - piston assembly in cylinder liner

Components before final installation with engine oil.



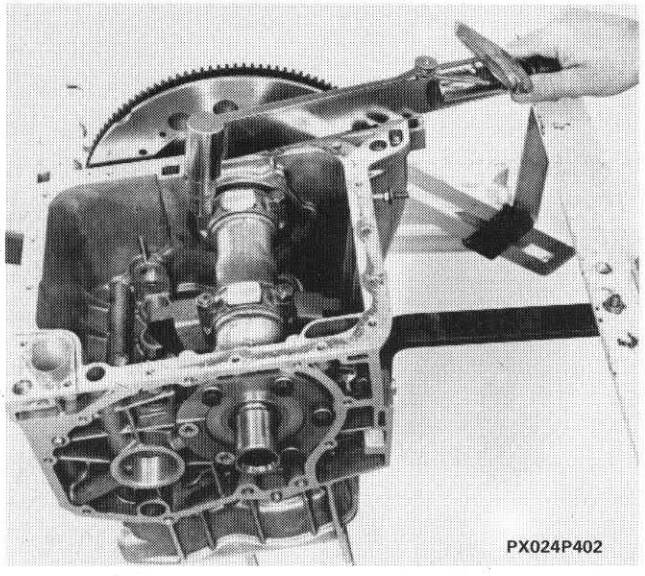
10.



CRANK PIN CLEARANCE MEASUREMENT

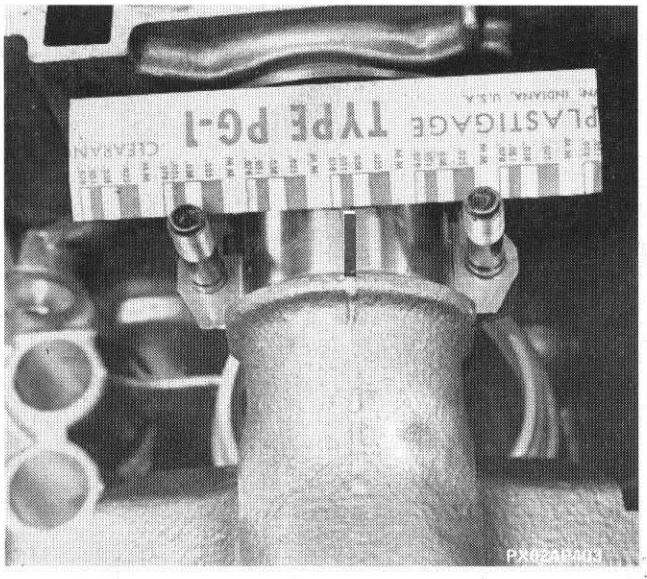
Apply edge of plastigage to crankpins

The gauge edge is arrowed



3,4 daNm

Tighten con rod cap retaining bolt nuts in pairs



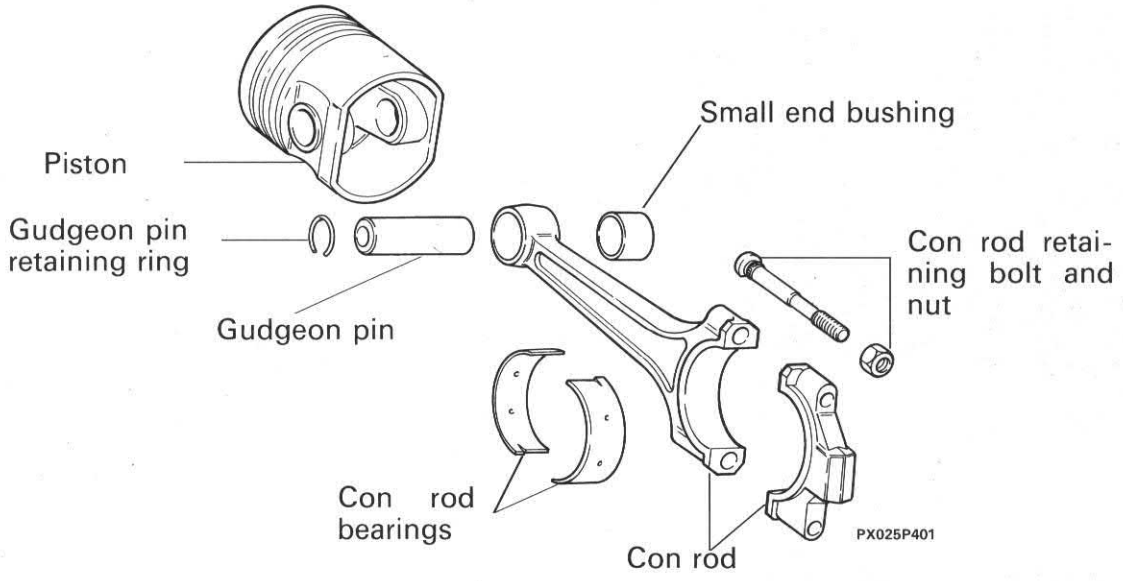
0,024 ÷ 0,074

Measure clearance between pins and con rod bearings using special gauge

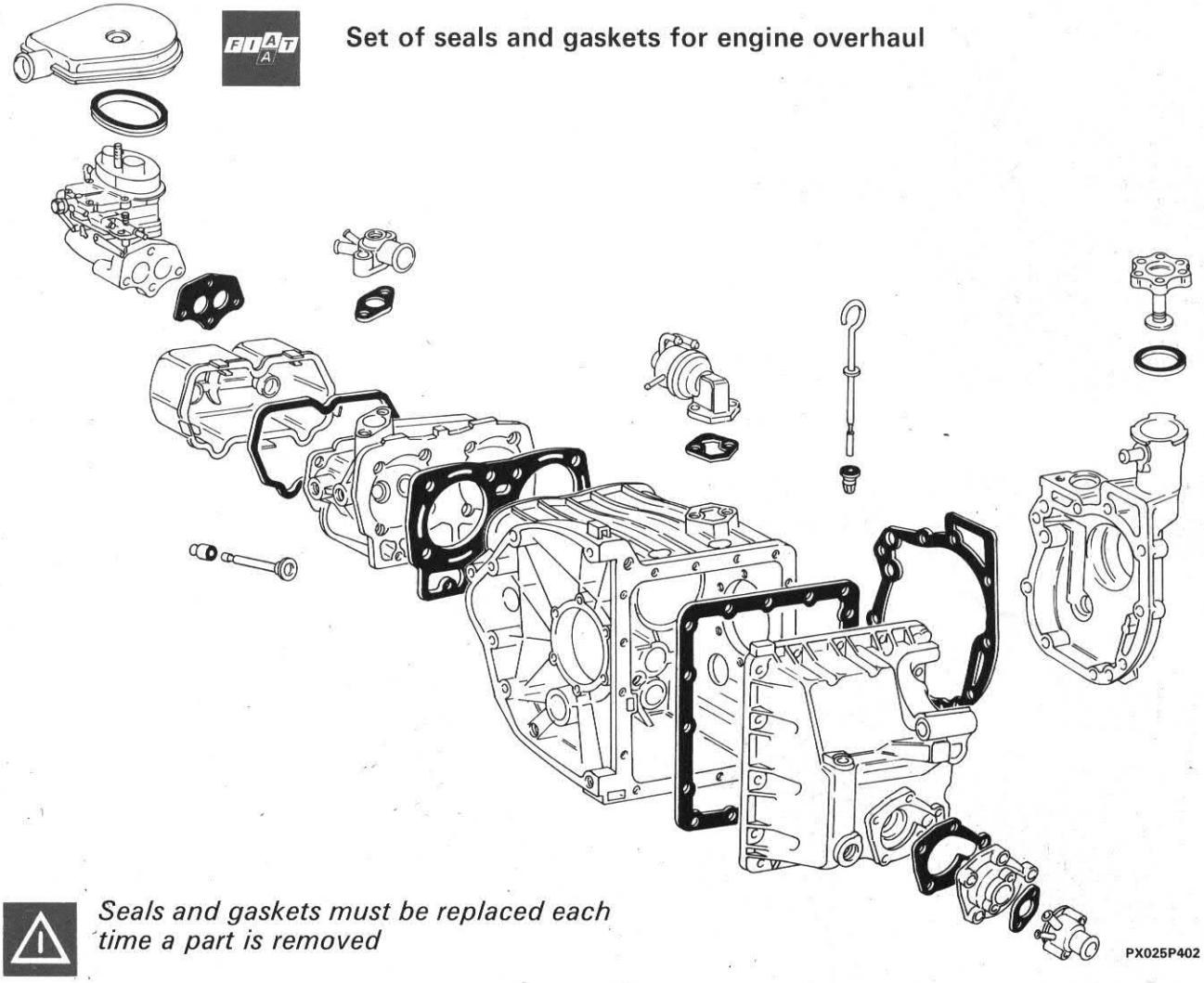
Components prior to final assembly with engine oil

Tighten con rod cap screws in pairs

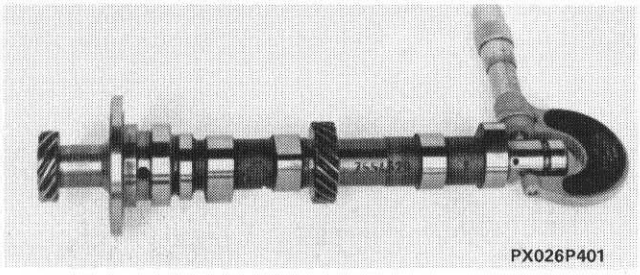
View of con rod - piston components, supplied as spares

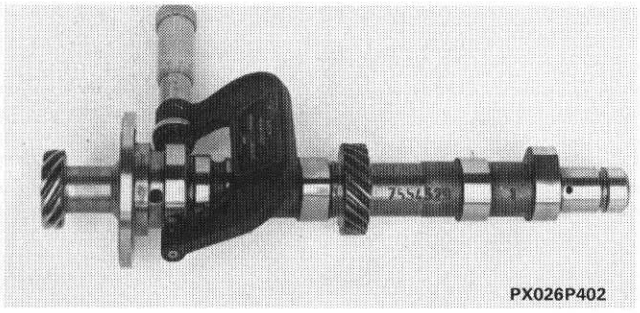


Set of seals and gaskets for engine overhaul



Seals and gaskets must be replaced each time a part is removed


PX026P401

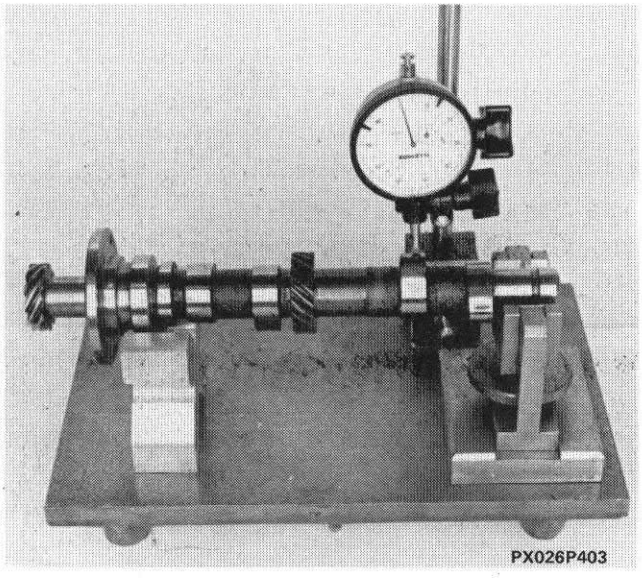

PX026P402

CAMSHAFT

Ø1	21,979 ÷ 22,000
Ø2	42,975 ÷ 43,000

Camshaft journal measurement

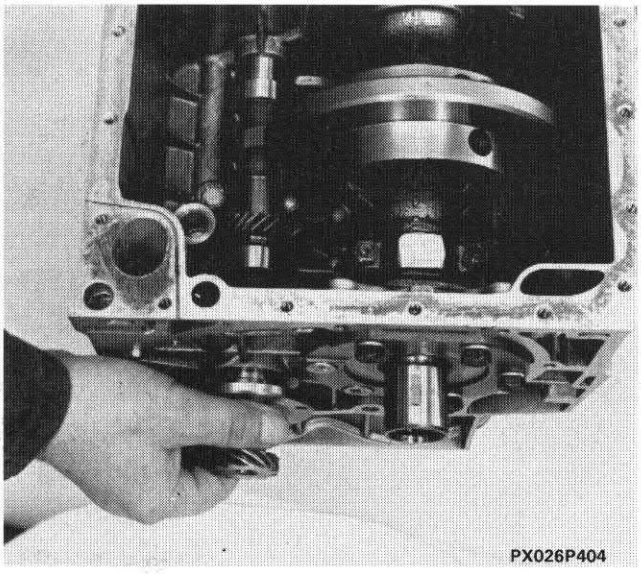
NOTE *Cam and journal surfaces must not show signs of binding or scoring. Replace camshaft if this is the case.*


PX026P403

	5,868
	5,868

Cam height measurement

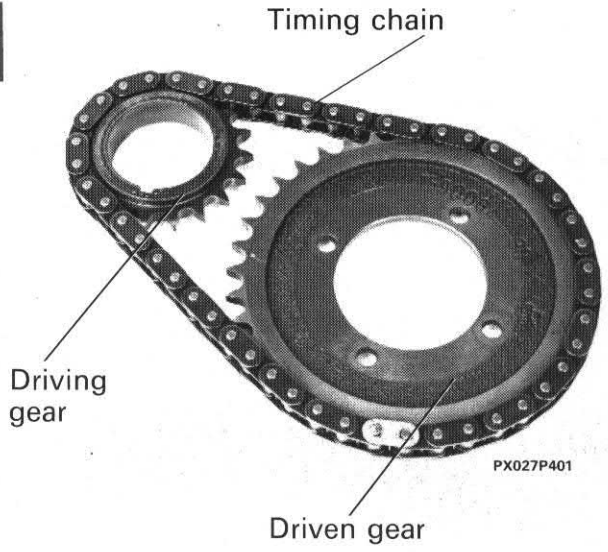
Ignition breaker gear and accessory gear must not show signs of chipping or excessive tooth wear.
The camshaft must be replaced even if only one cam shows signs of excessive wear


PX026P404

Camshaft installation

components with engine oil prior to final installation

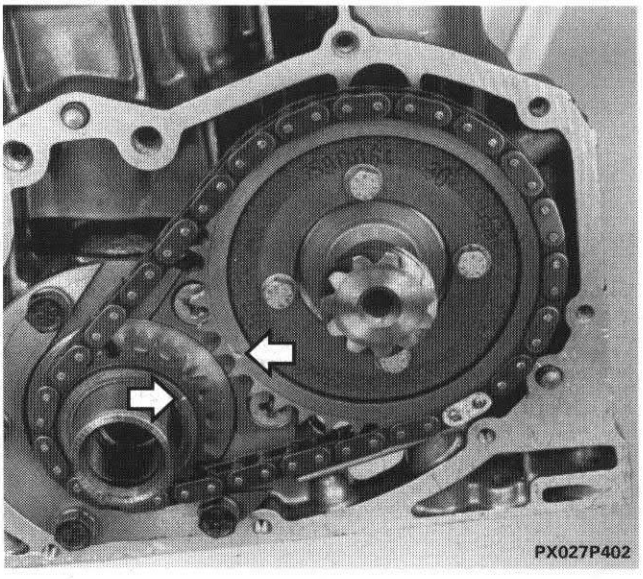
CAMSHAFT DRIVE



Camshaft drive check

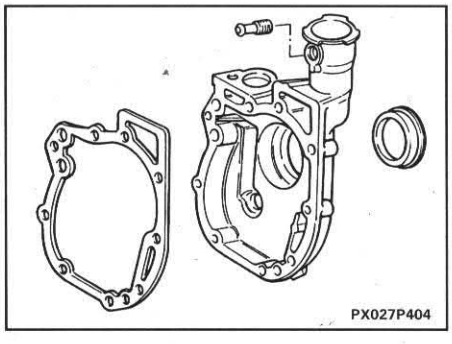
Do not replace camshaft drive components individually (chain, driving gear and driven gear).

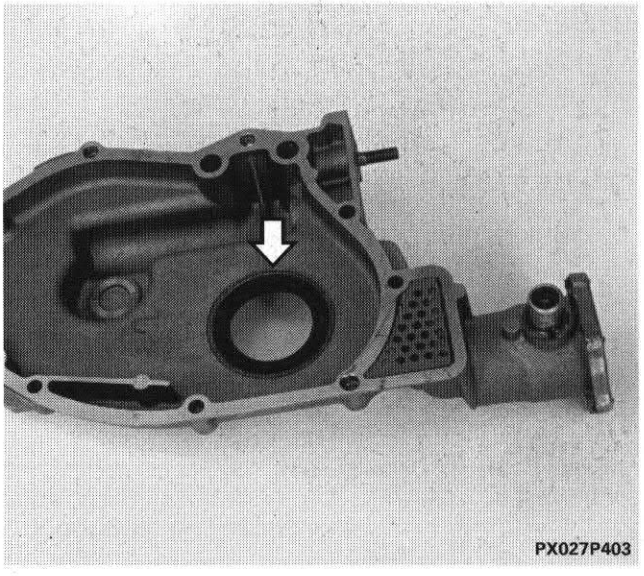
1 daNm



Installation and tightening of camshaft drive

NOTE *Line up the reference marks on the two gears during timing adjustment (the reference marks are arrowed).*

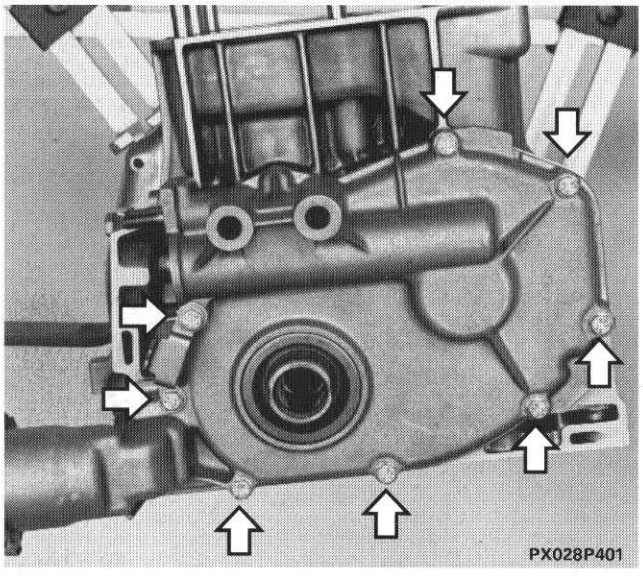


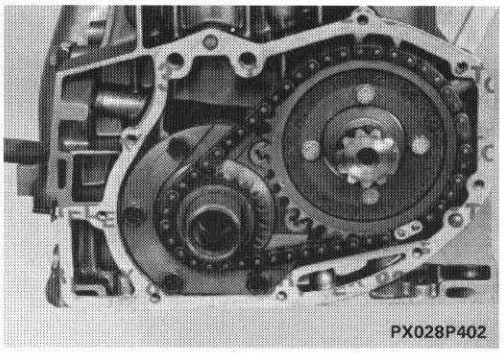


Installation of seal on timing cover

Use an ordinary driver for installation and removal operations.
Oil seal with engine oil prior to installation.

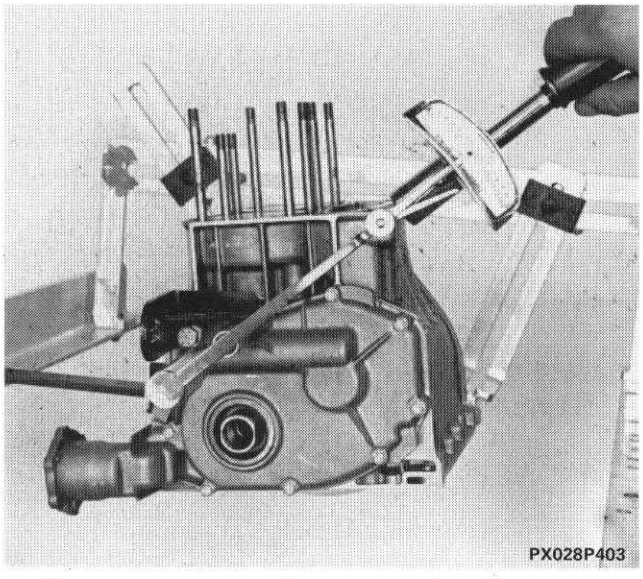
10.





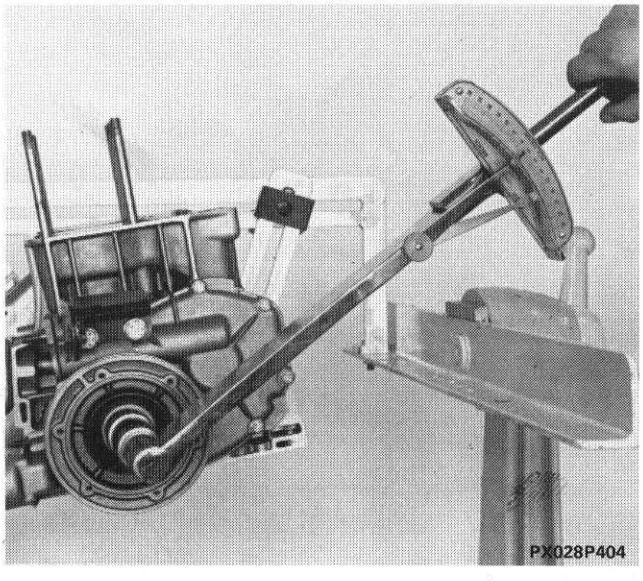
Installation of timing cover and seal

Screws securing timing cover to engine block are arrowed.



4,9 daNm

Installation of engine mounting bracket and torque tightening of screws



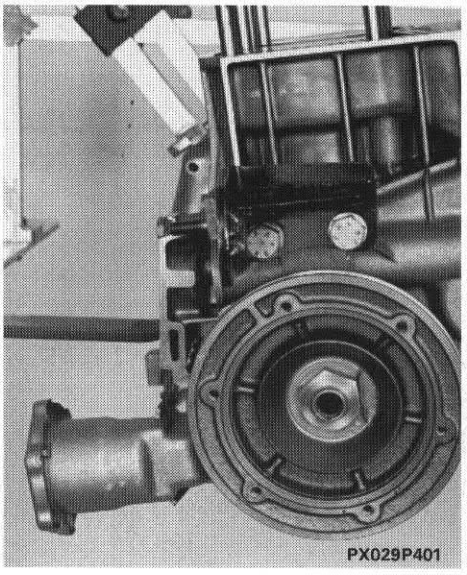
CENTRIFUGAL FILTER

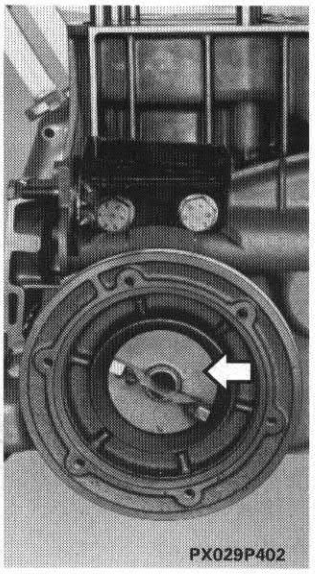
14,7 daNm

Installation of alternator drive pulley, deflector, lock washer and hollow screw

Torque tightening of hollow screw

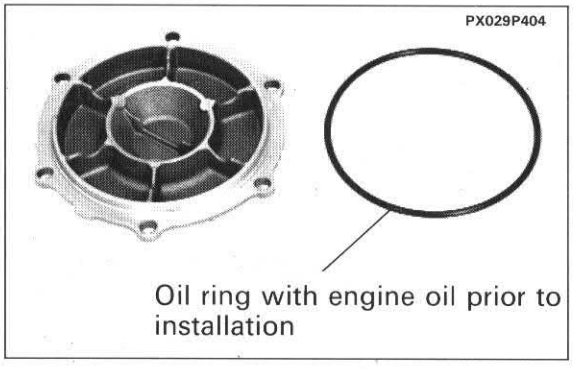
Before tightening hollow screw, drive shaft rotation must be blocked using tool 1860161000 (flywheel retainer) so that lock washer may be secured.

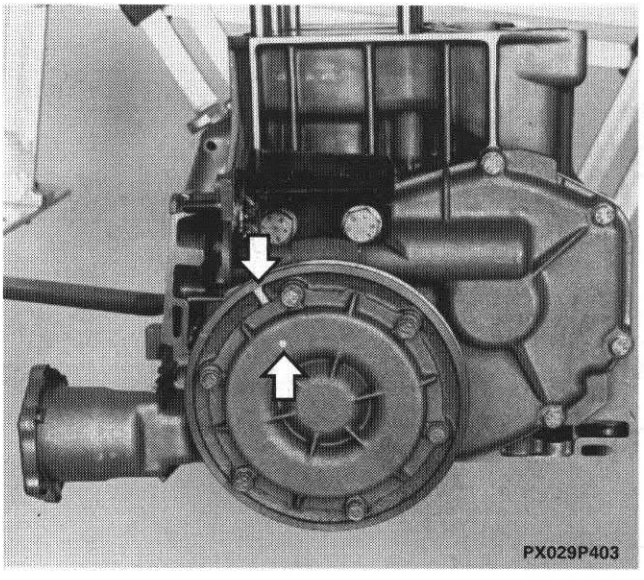




Deflector installation

Fit deflector to hollow screw after securing lock washer

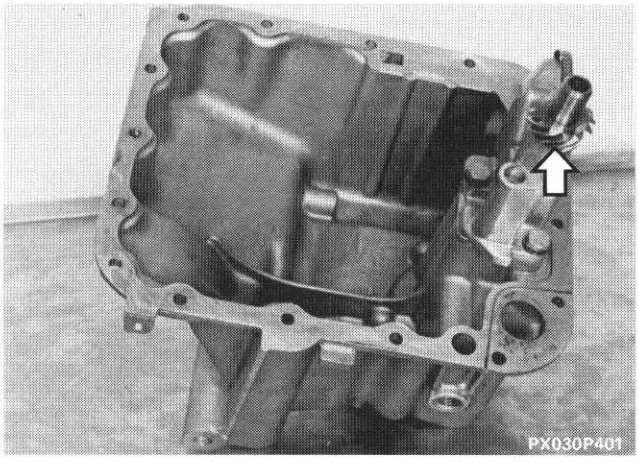




Centrifugal filter cover installation

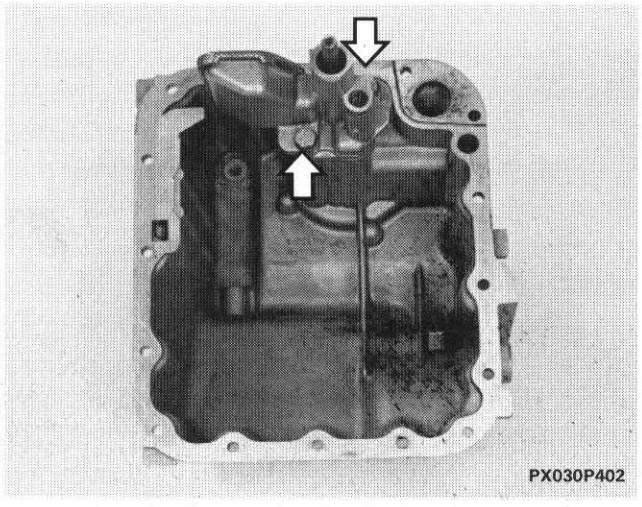
Line up mark on centrifugal filter cover with mark on alternator drive pulley for more convenient assembly

10.



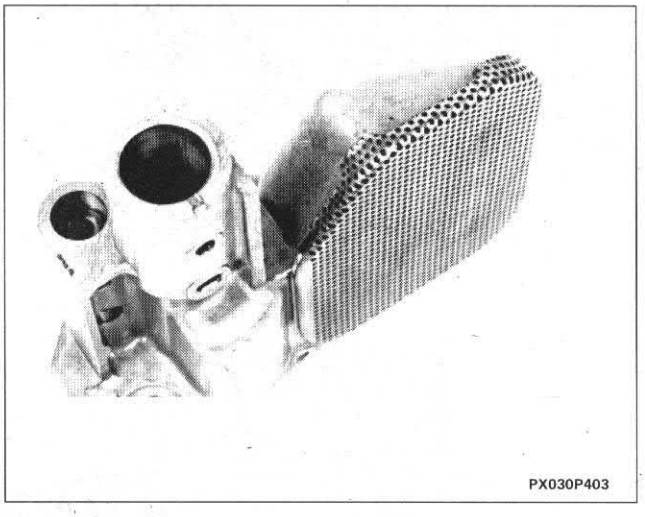
OIL PUMP

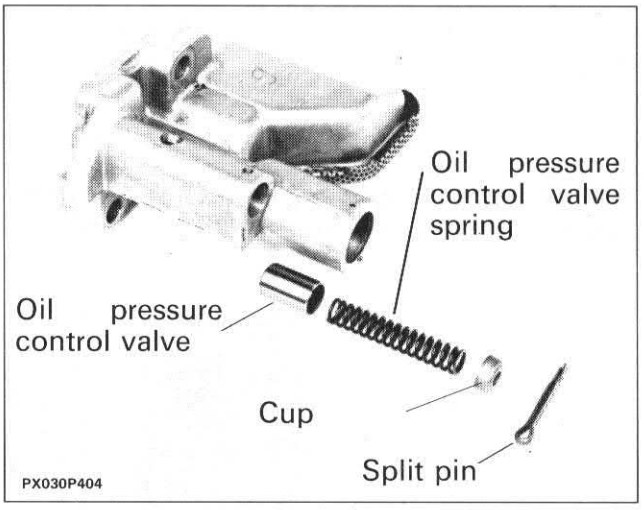
Accessory shaft drive gear installation-removal



Installation-removal of oil suction filter with built-in control valve

Arrows indicate screws to be removed



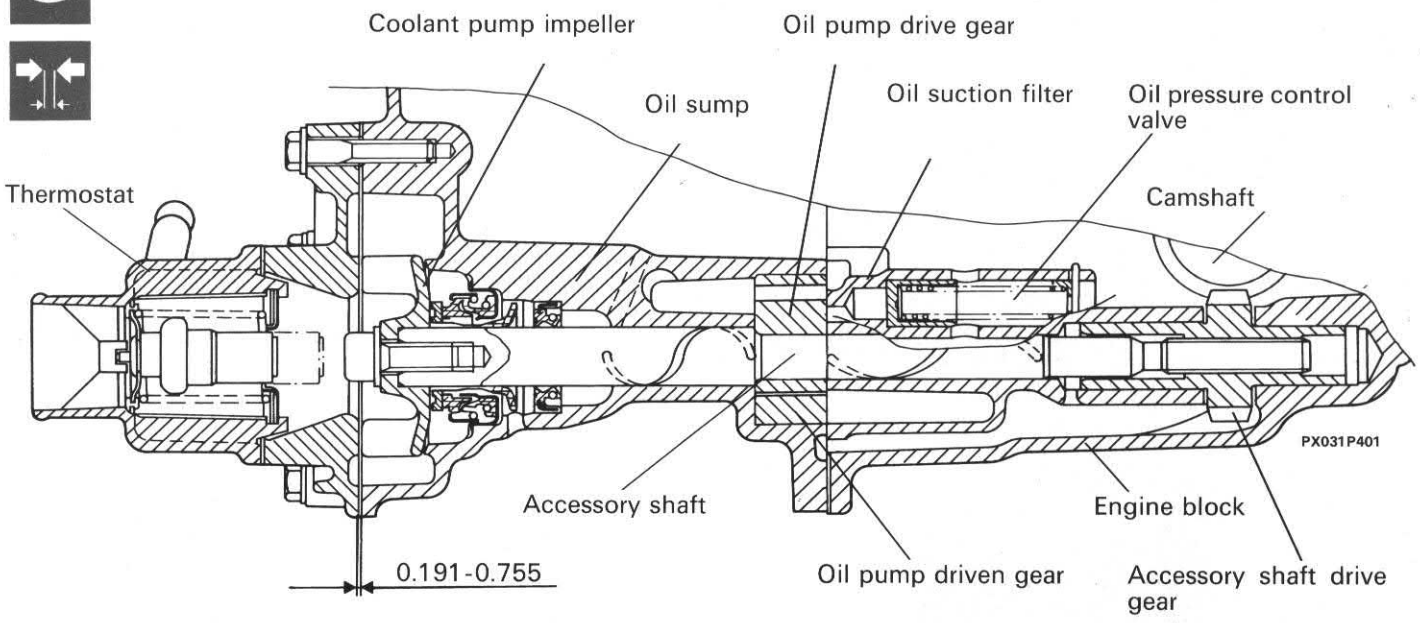


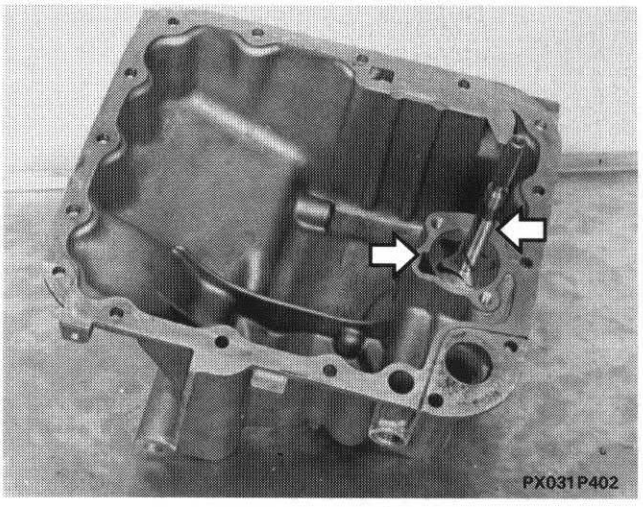
Oil suction strainer with built-in control valve

Check that oil suction filter and sump mating surfaces are flat and not scored or pitted. Thoroughly clean components during assembly.

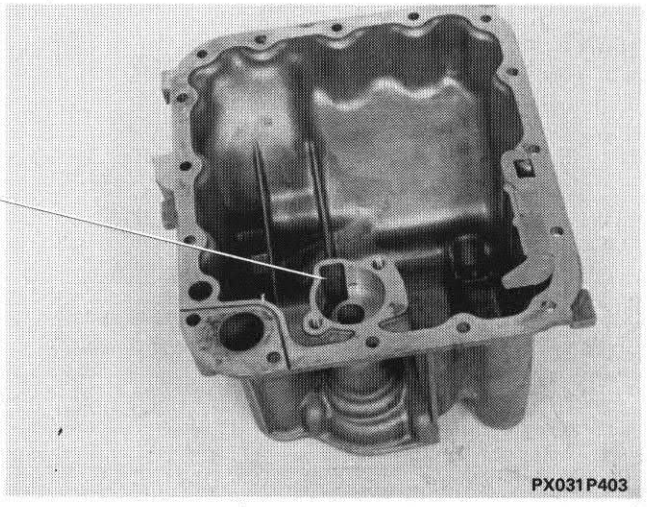
Before assembly, check that oil pressure regulation spring is loaded to 2.35 - 2.45 daN for a height of 36 mm, or 4.29 - 4.54 daN for a height of 29 mm.

Cross section of accessory shaft



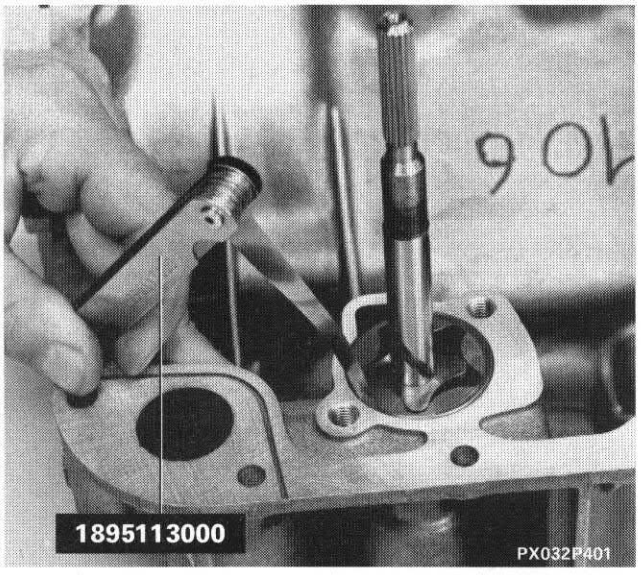


Removal-installation of accessory shaft and oil pump driven gear



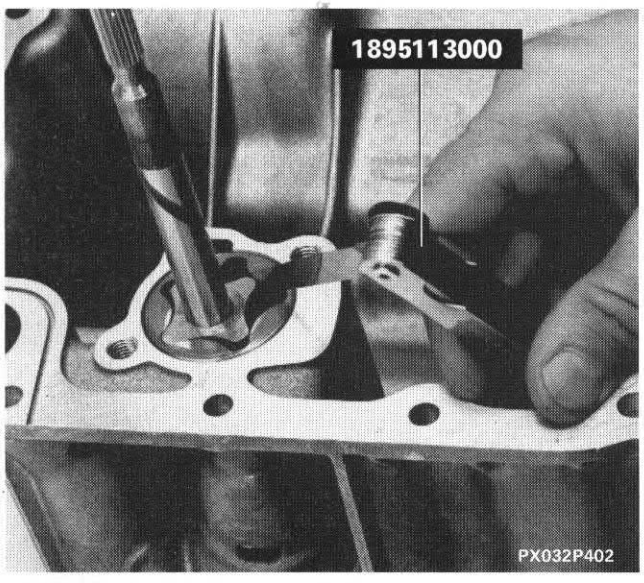
Check that oil pump housing (in sump) does not show signs of wear or damage.

10.



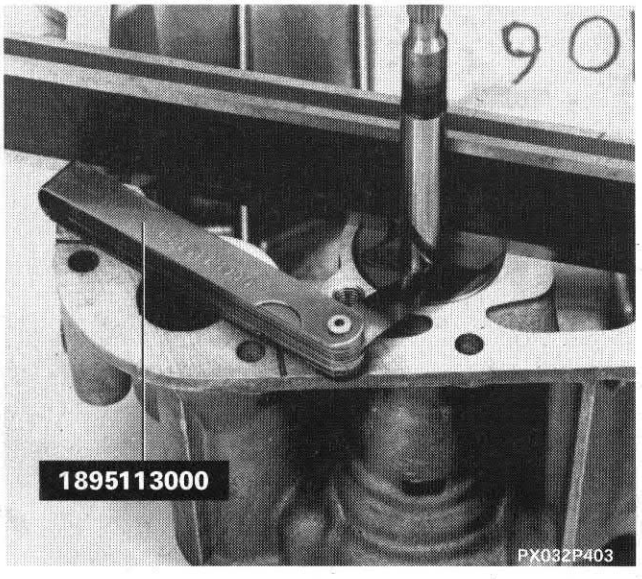
0,080 ÷ 0,189

Check clearance between pump seat and driven gear



0,025 ÷ 0,100

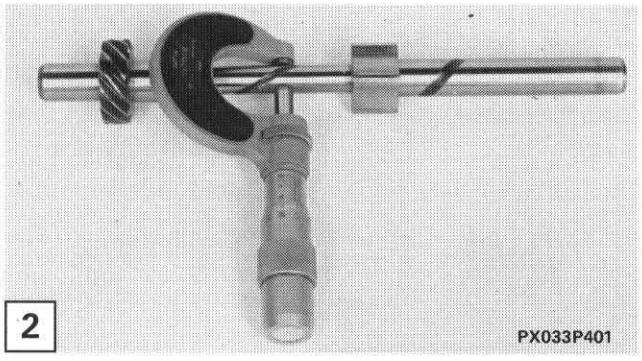
Check clearance between driving gear and driven gear

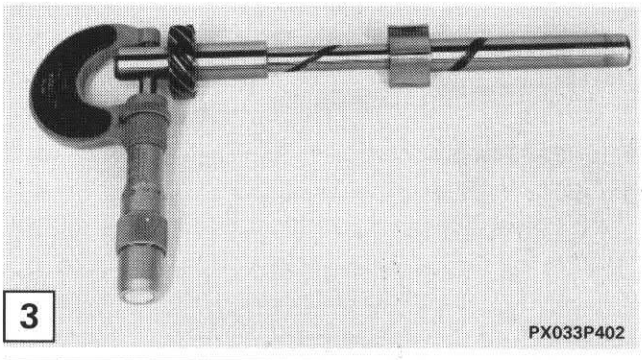


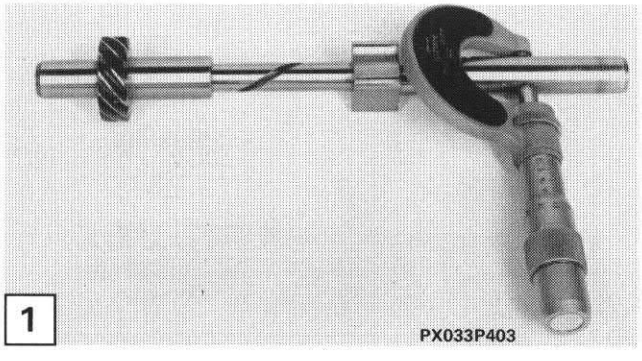
0,045 ÷ 0,120

Check clearance between pump cover support and top end of pump gears

If clearances are not as specified replace oil sump, accessory shaft and driven gear.





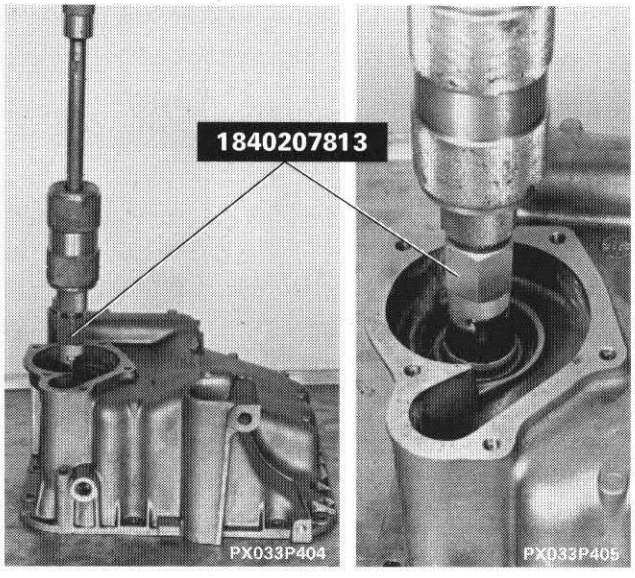


$\varnothing_1$	15,989 ÷ 16,000
$\varnothing_2$	11,901 ÷ 11,913
$\varnothing_3$	15,970 ÷ 15,985

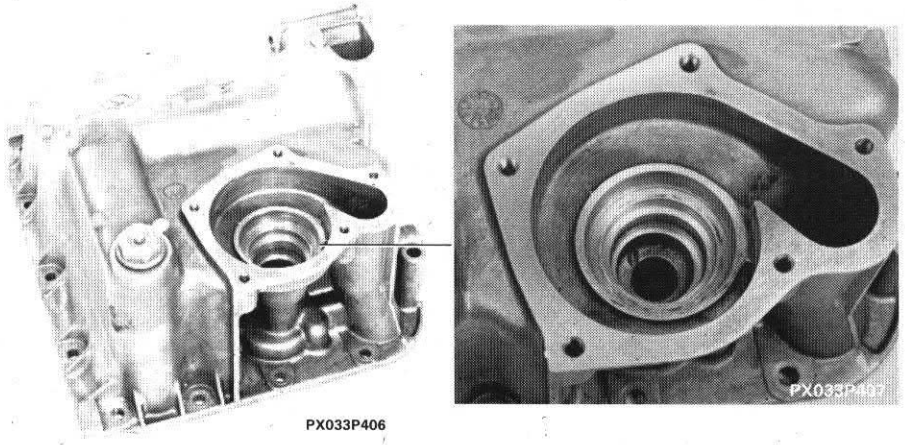
ACCESSORY SHAFT

Accessory shaft journal measurement

NOTE *Oil pump driving gear and journal surfaces should not show signs of binding or scoring. Replace accessory shaft if this is the case.*

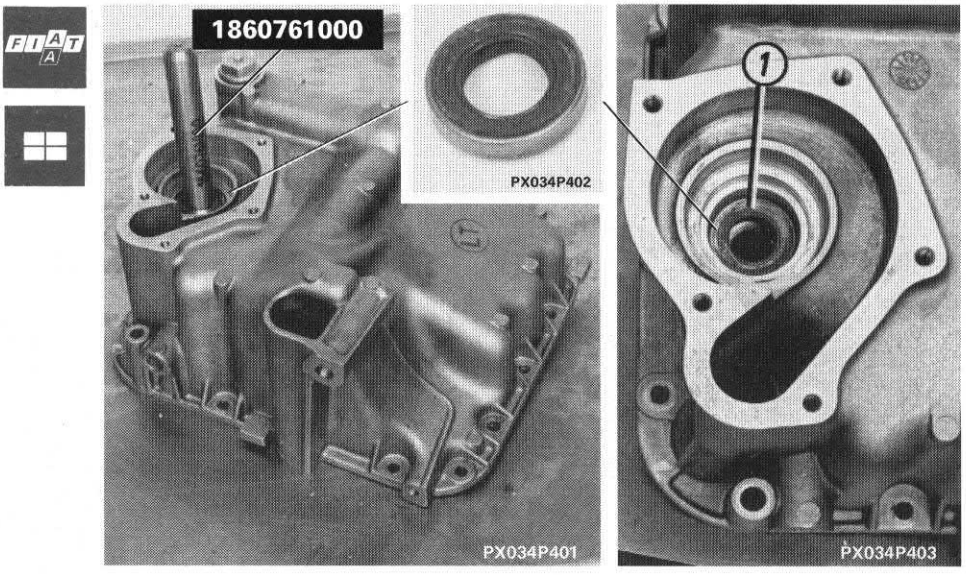


Remove coolant pump packing box and remove oil pump seal

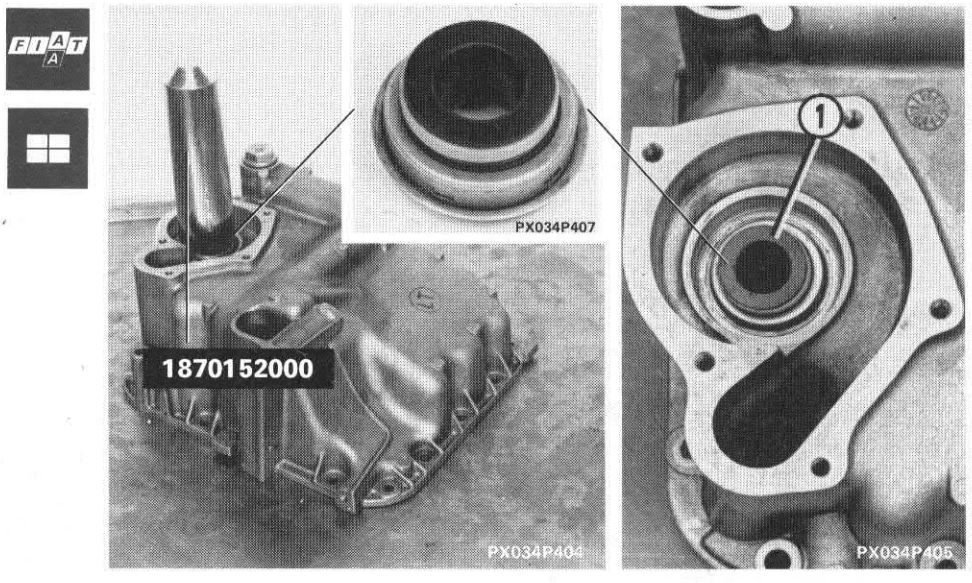


Check that coolant pump seat (in sump) does not show signs of wear or damage.

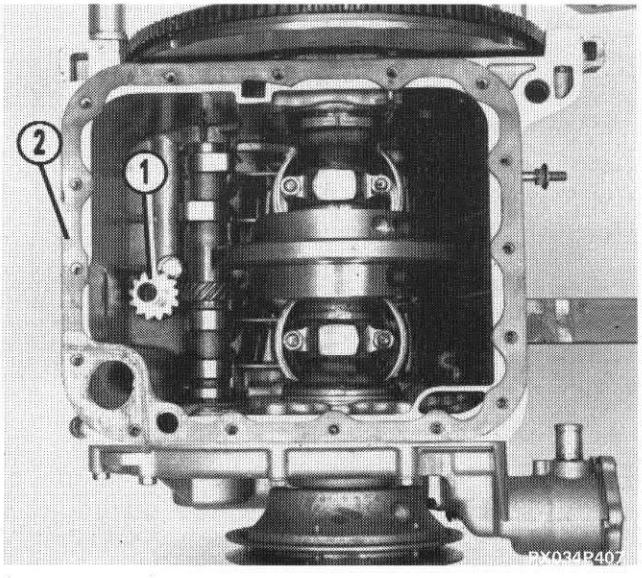
10.



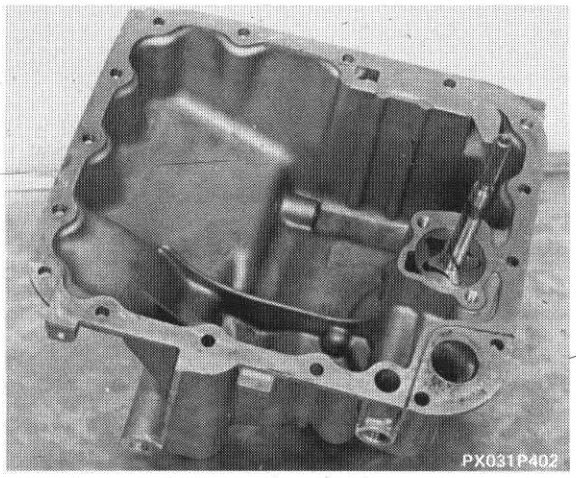
Installation of oil pump seal (1) on sump

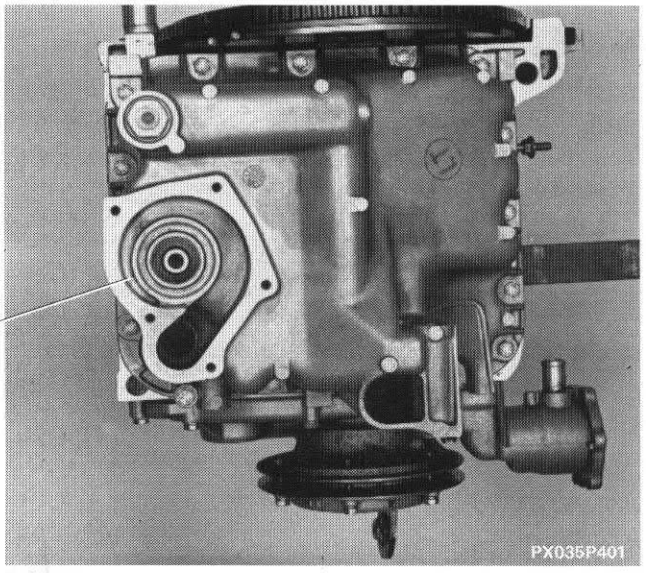


Installation of coolant pump packing box on (1) oil sump



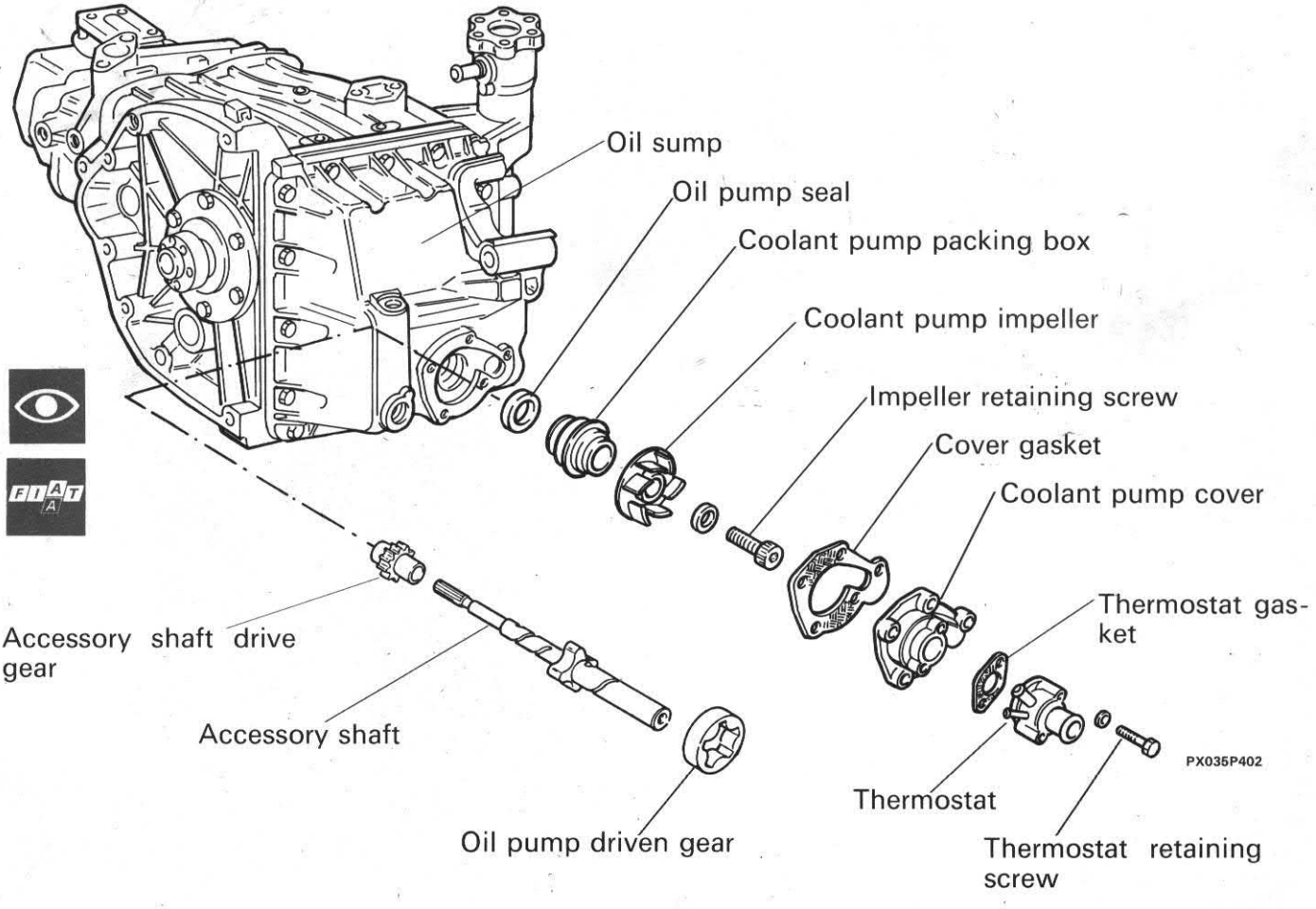
Installation of accessory shaft drive gear (1) and oil sump gasket (2)





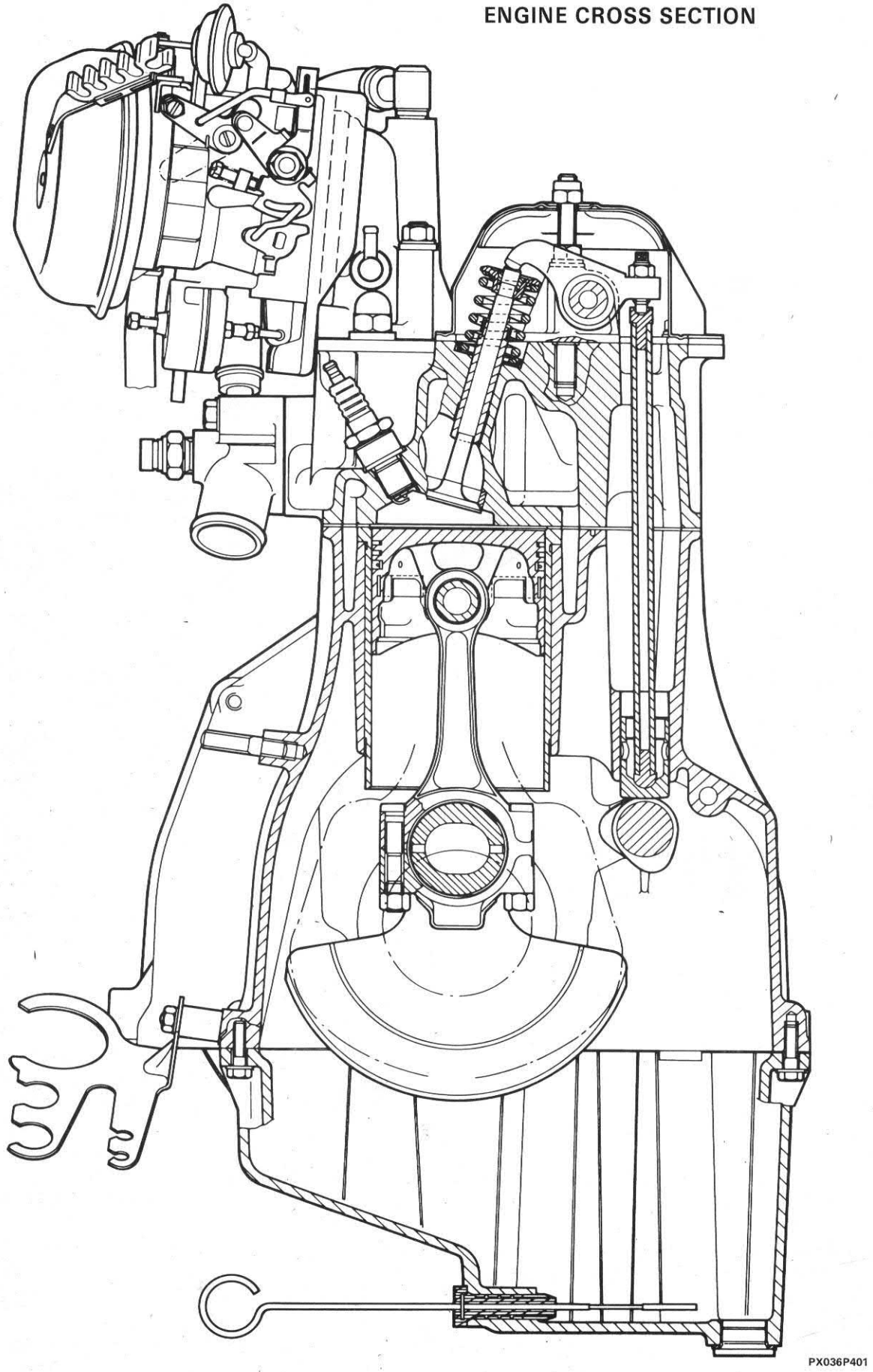
Installation of oil sump complete with accessory shaft and oil pump driven gear

Spares supplied for lubrication and coolant systems



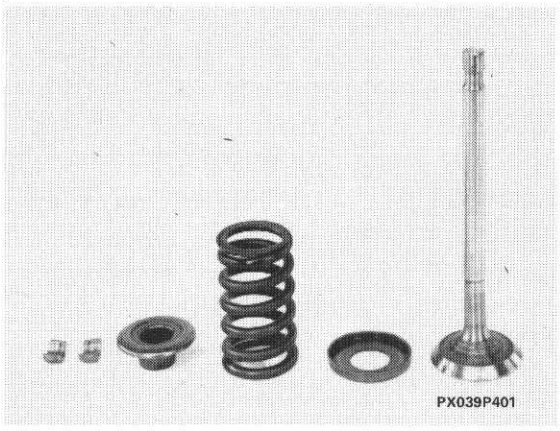
10.

ENGINE CROSS SECTION

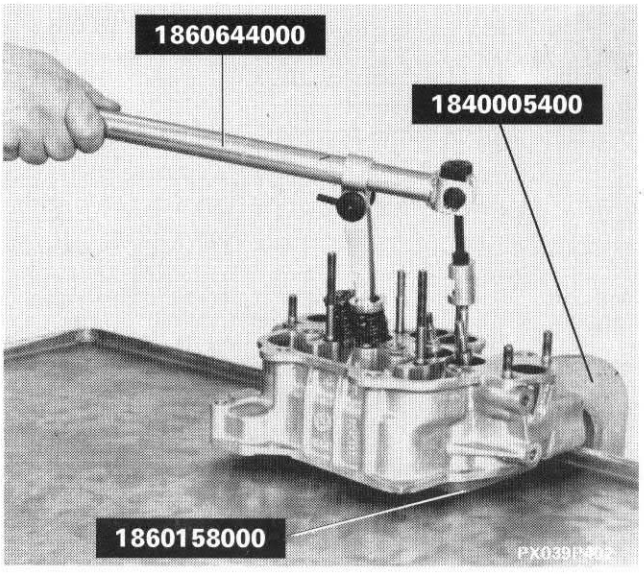


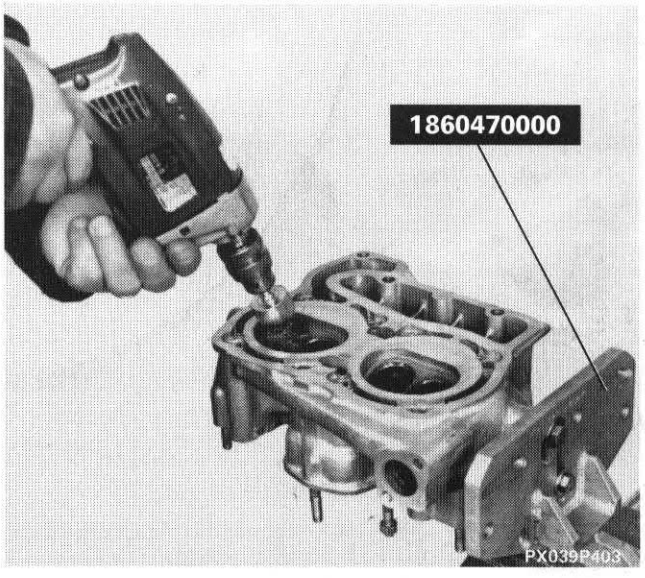
PX036P401

DISASSEMBLY AND CHECKS



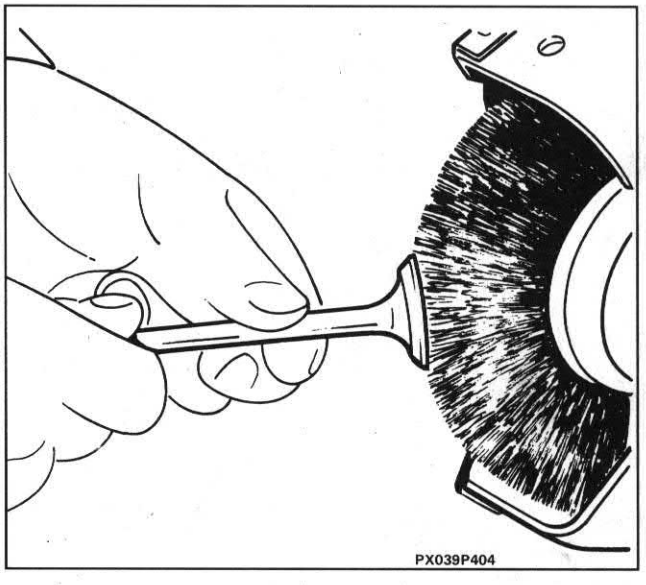
Removal of lock cones, cups, springs and valves





Descaling and cleaning of valve seats and ports

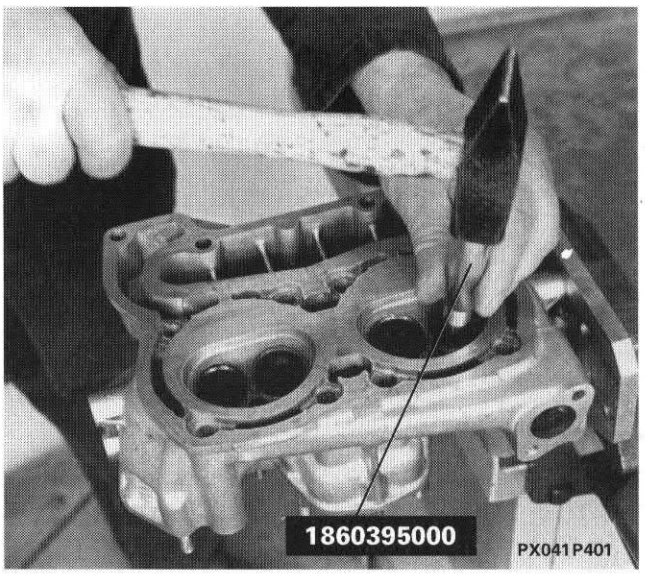
VALVES



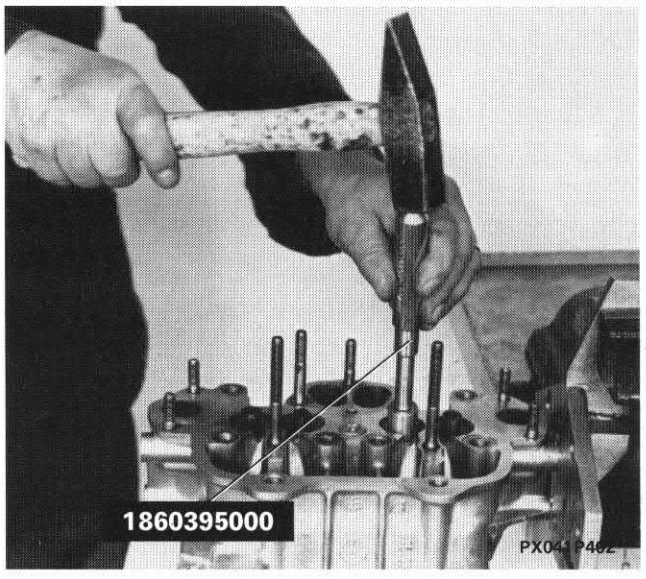
Valve descaling

Check that the valve stem does not show signs of scoring or binding. Also use micrometer to check that valve stem meets specified measurement values.

VALVE GUIDES



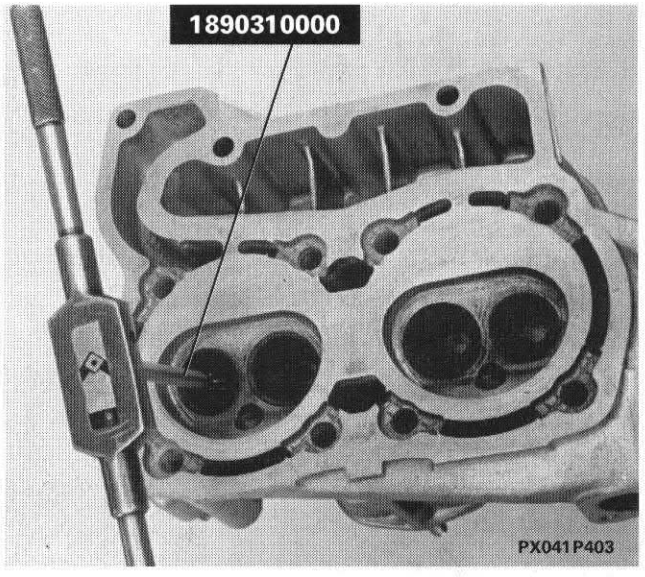
Valve guide disassembly



Valve guide assembly

Spare valve guides are available with outer diameter oversized by 0.05 - 0.10 - 0.25 mm.

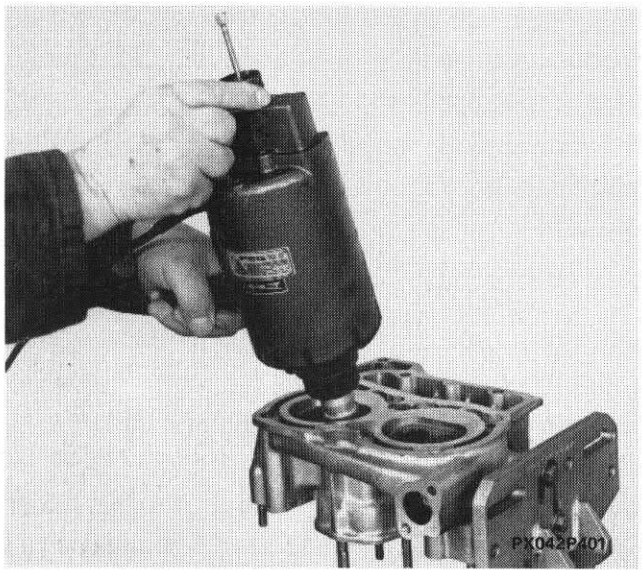
NOTE *Before fitting new valve guides, heat cylinder head to 100°C - 120°C.*



Boring inner surface of valve guide

Carry out in case of slight distortion during press-fitting

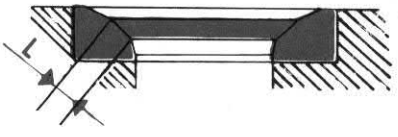
10.

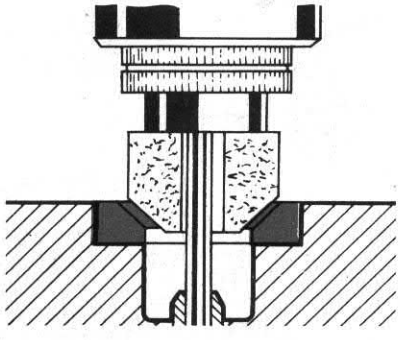


Reface valve seats on cylinder head

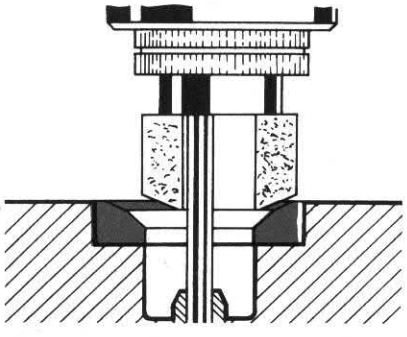
NOTE *Reface valve seats on cylinder head every time valves and valve guides are refaced or replaced.*

L = Valve seat ground at 45° to specified width

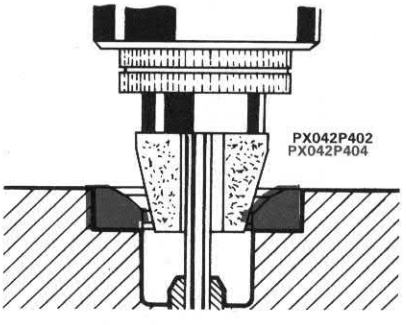




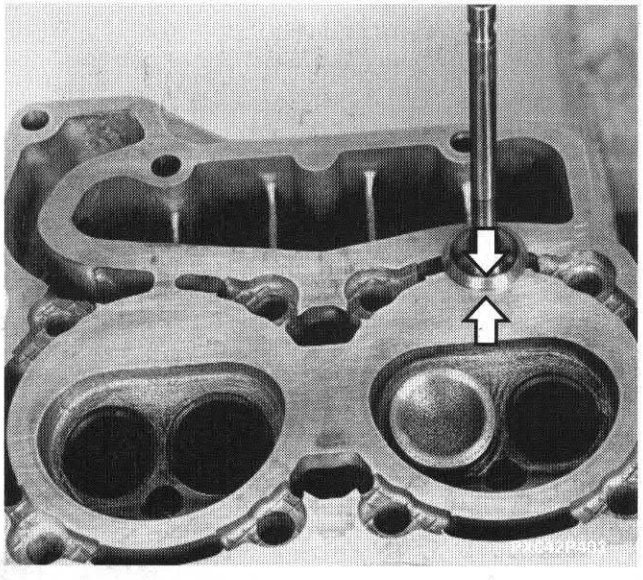
Grinding of valve seats with wheel at 44°30'



Reduction of valve seat at top with wheel at 20°

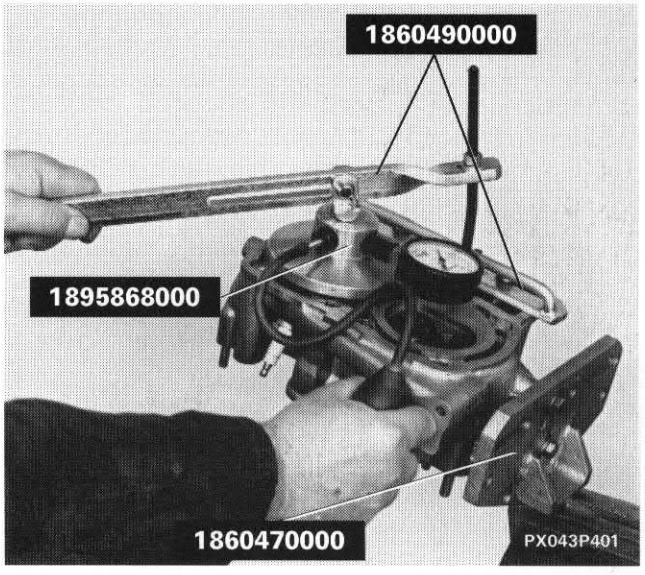


Reduction of valve seat at bottom with wheel at 75°



Measurement of valve abutment line in seat

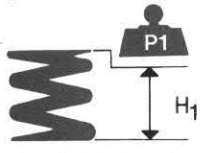
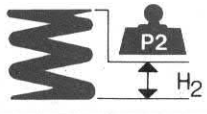
NOTE *If contact is not centred on valve stem head, grind cylinder head seats as necessary. If centring is not possible, replace valve seat.*



Valve seal pressure testing

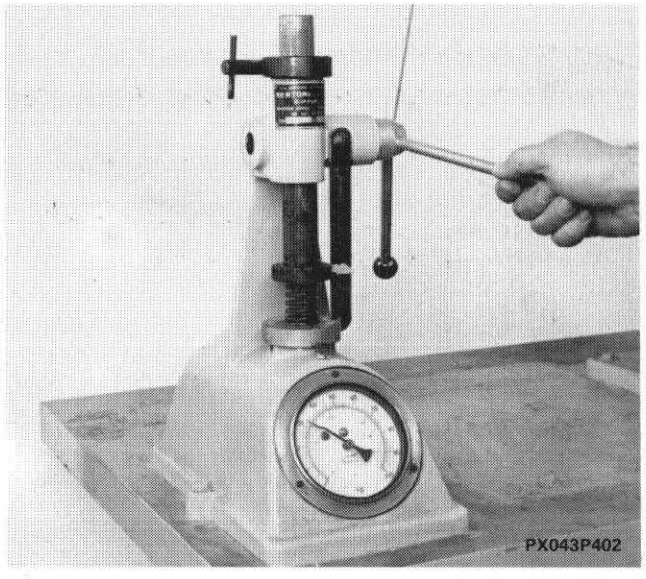
Fit spark plugs before carrying out test.

VALVE SPRING

	P_1	27.7 - 31.2 daN
	H_1	39 mm
	P_2	61.0 - 66.7 daN
	H_2	29.3 mm

Check valve spring load

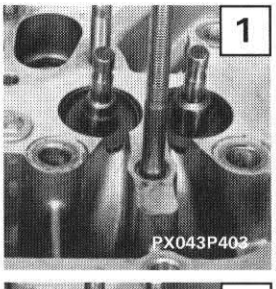
NOTE *Spring must be checked before installation to ensure load is as specified.*

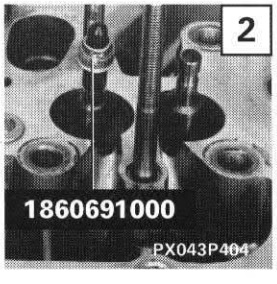


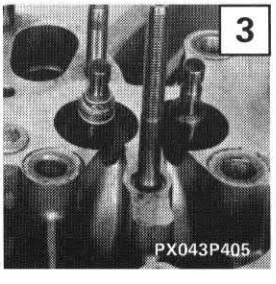
Installation of oil seal on valve guide

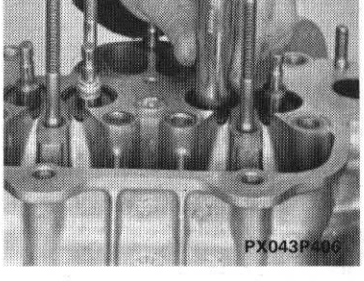
components with engine oil prior to final installation.

The pictures are numbered to indicate correct installation sequence.

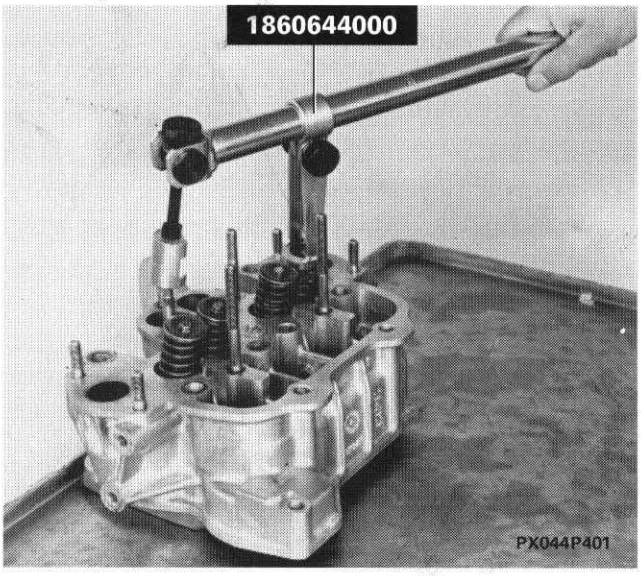








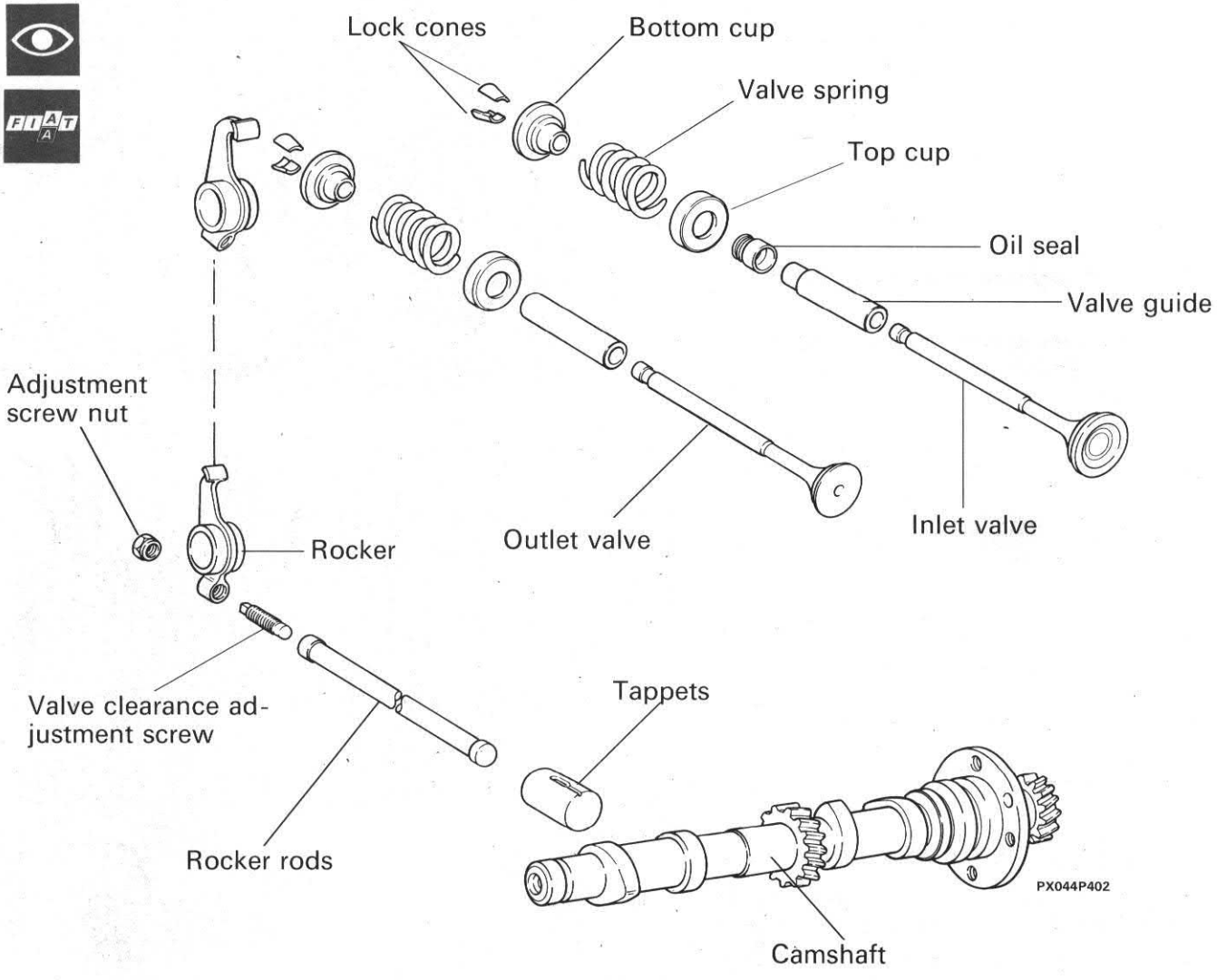
10.



Installation of valve, cups, spring and valve lock cones

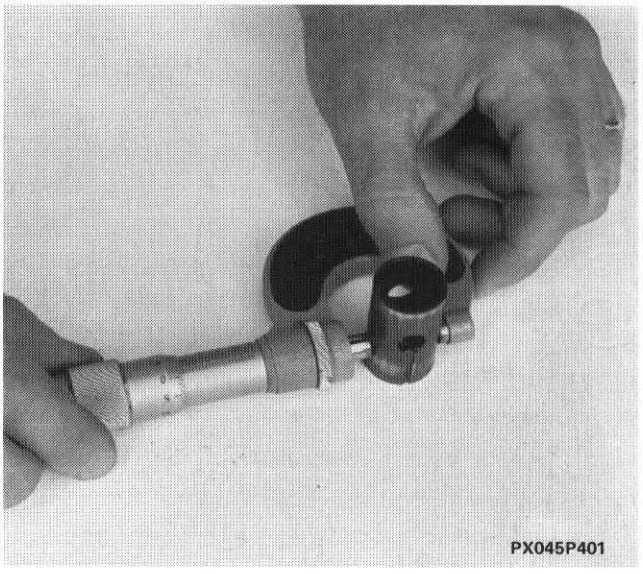
parts with engine oil prior to final assembly

Valve gear parts supplied as spares



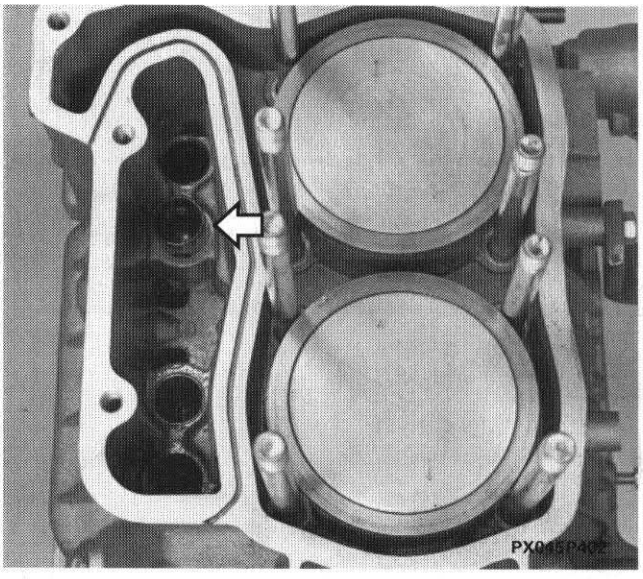
TAPPETS

21,978 ÷ 21,996



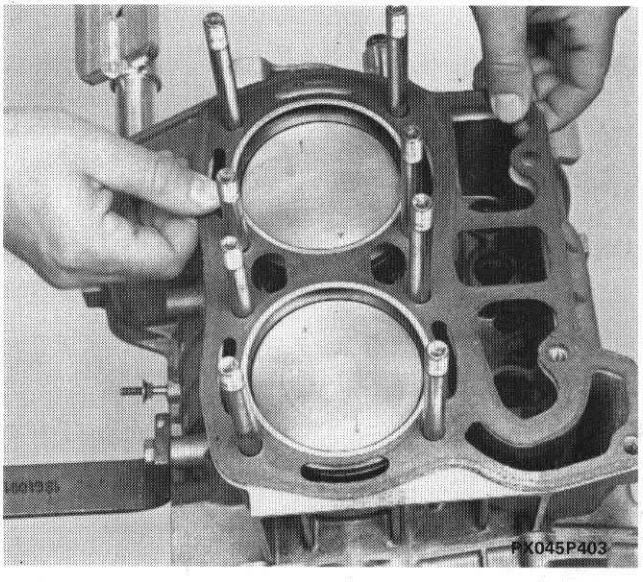
Tappet diameter check

NOTE *Tappets should be replaced in the case of ovalisation or binding on diameter, or binding of surfaces in contact with cam shaft throws.*
Tappets are also available oversized by 0.05-0.10 mm.



Installation of tappets in engine block

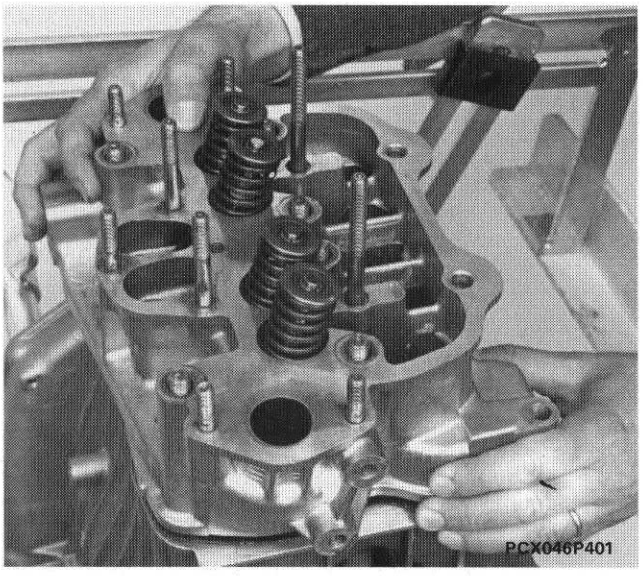
components with engine oil prior to final assembly.



Installation of cylinder head gaskets

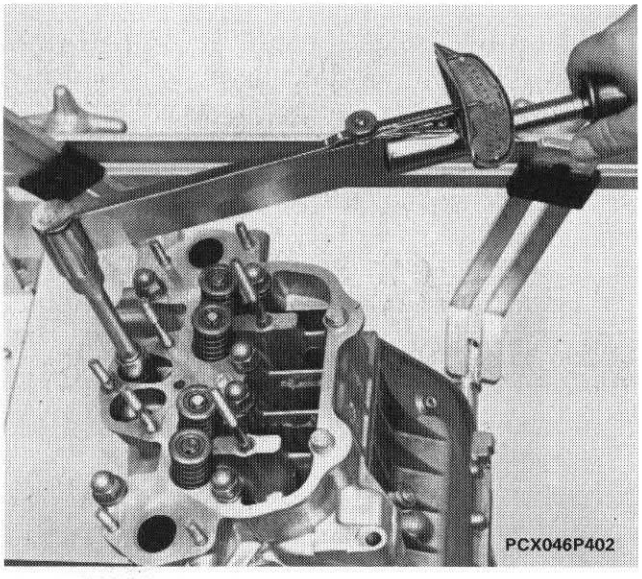
NOTE *Position cylinder head gasket on engine block. Ensure "ALTO" mark is positioned at top.*

10.



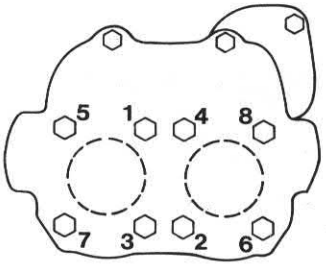
CYLINDER HEAD TIGHTENING

Installation of cylinder head



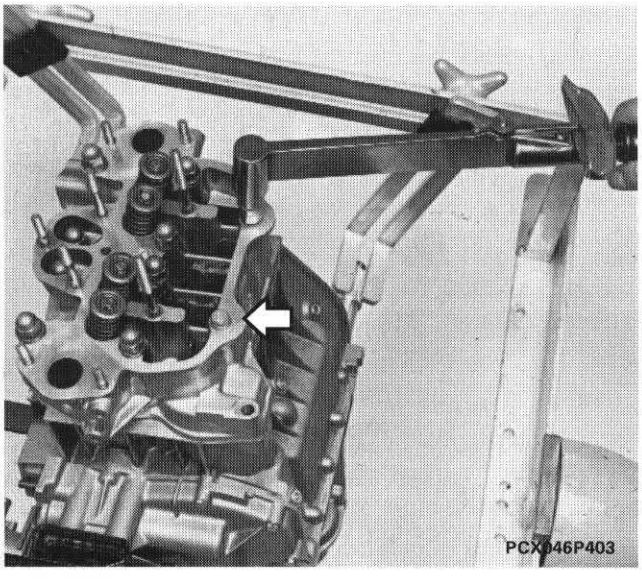
4,9 daNm

Diagram to show tightening order of screws retaining cylinder head to engine block



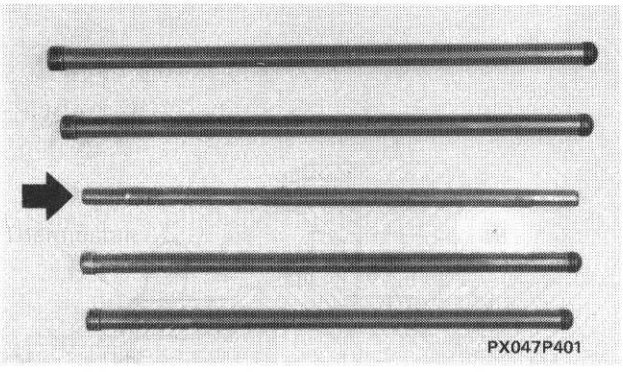
Torque tightening of cylinder head to engine block

Tighten cylinder head in two stages: first tighten bolts to a torque of 2.5 daMn, then to 4.9 daNm.



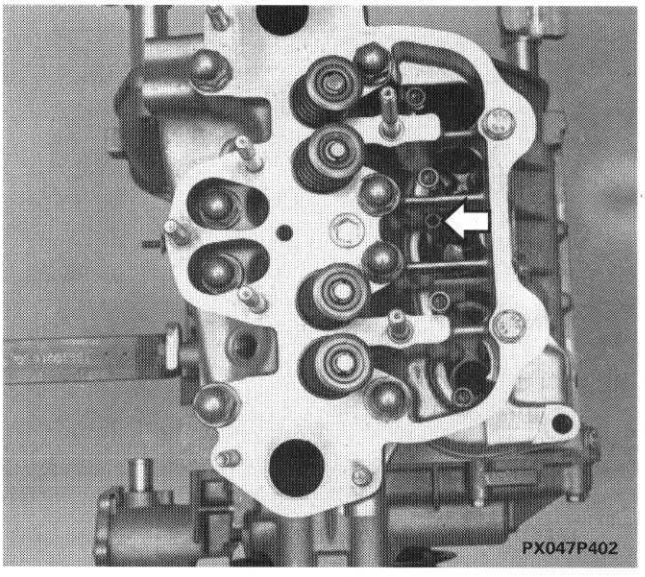
3 daNm

Torque tightening of screws retaining cylinder head to engine block

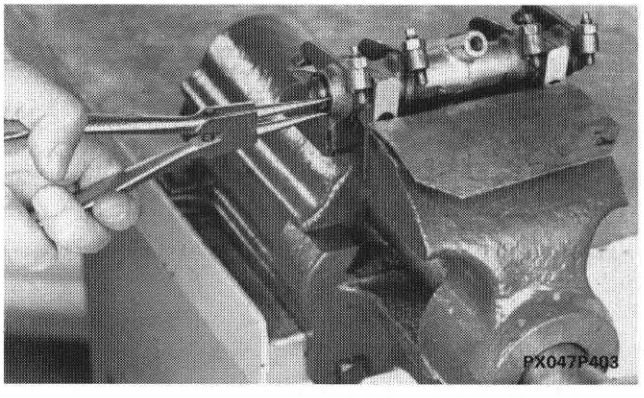


Installation of rocker control rods

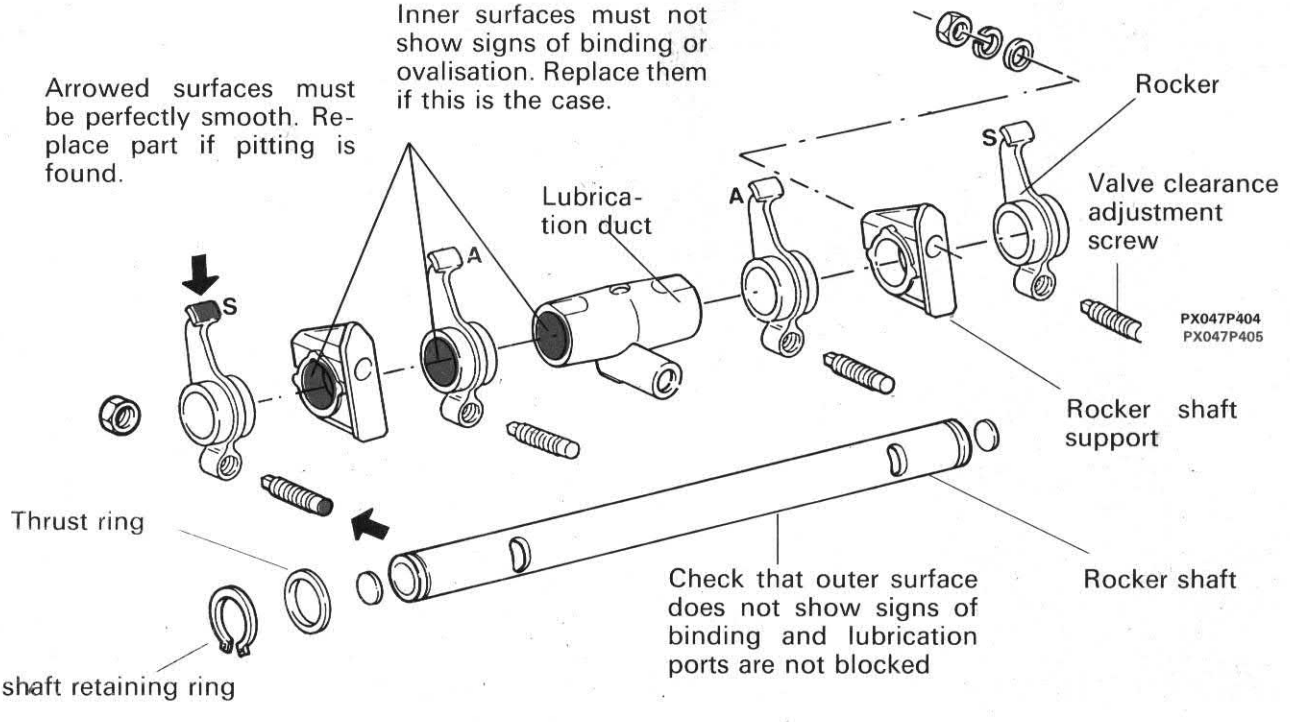
Rods should not show signs of distortion or wear on contact surfaces. Replace them if this is the case.
Check that oil delivery port to rocker shaft (arrowed) is not obstructed.



ROCKER SHAFT



Removal - checking - installation of rocker shaft



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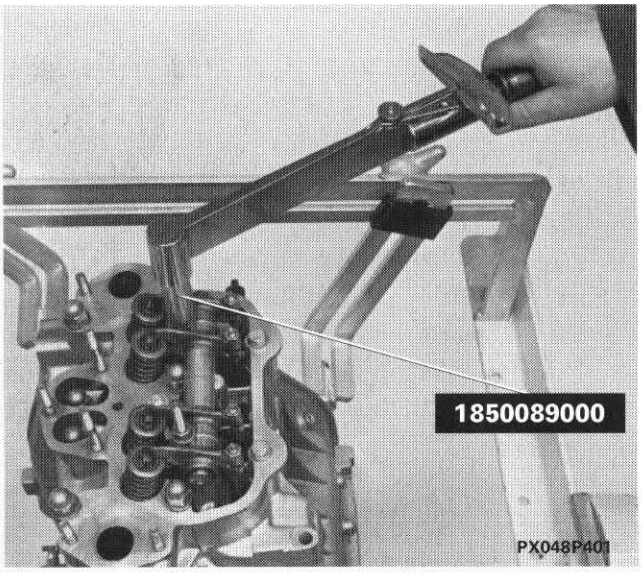
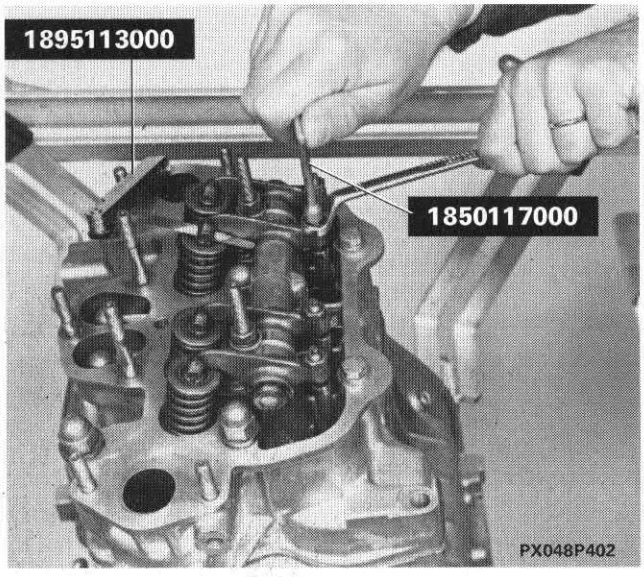


Installation of rocker shaft and torque tightening of support retaining screws

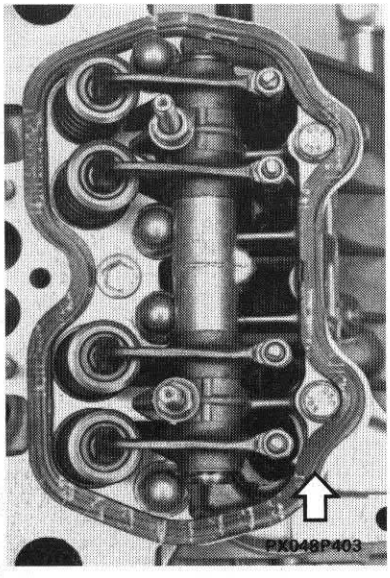
TAPPET CLEARANCE ADJUSTMENT

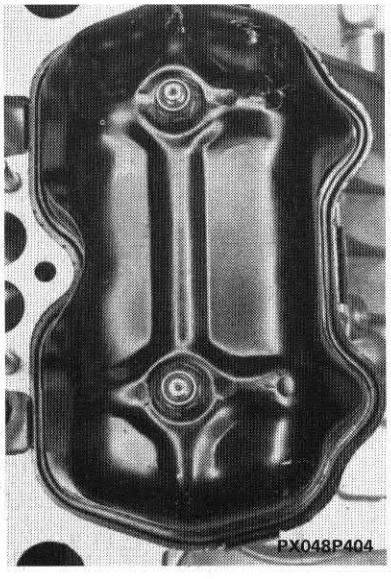
0,15 mm ± 0,05

0,15 mm ± 0,05

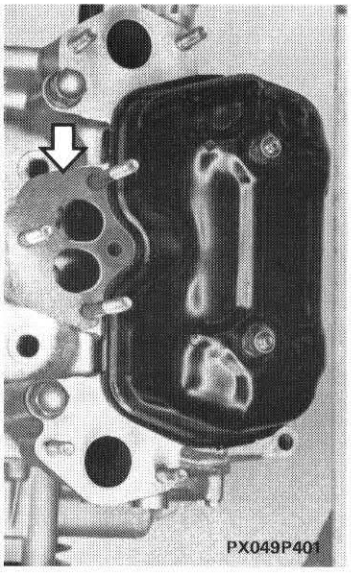


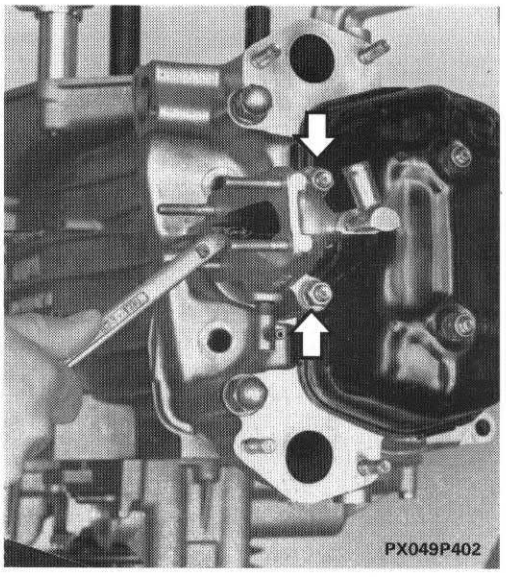
Valve-rocker clearance adjustment



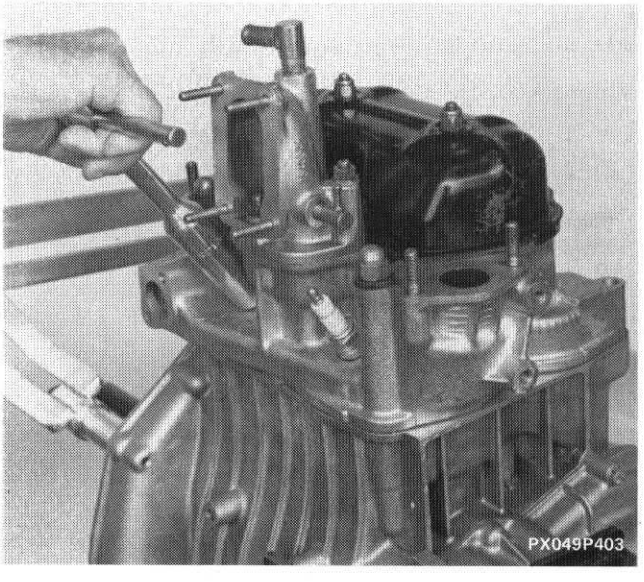


Installation of gasket and tappet cover

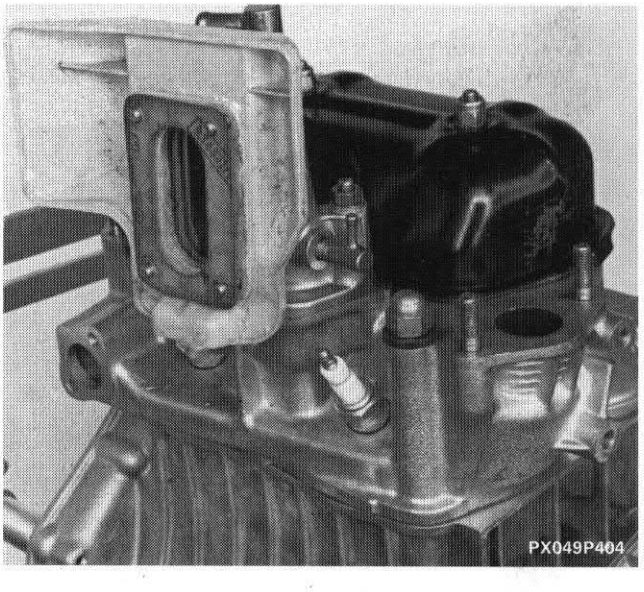




Installation of gasket and intake manifold

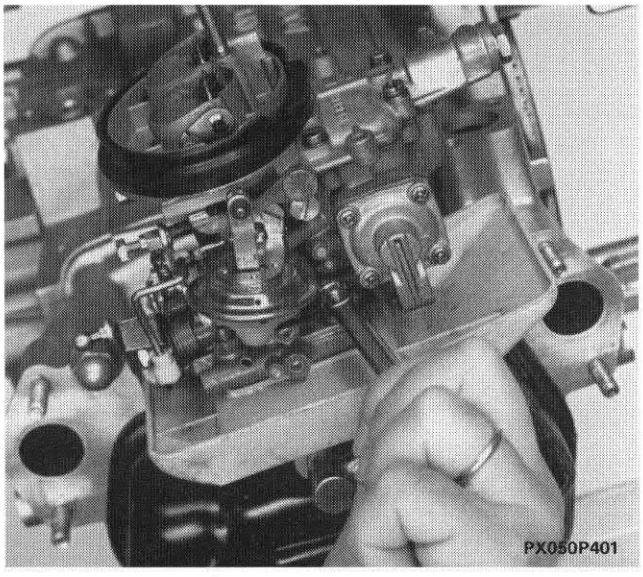


Installation of spark plugs

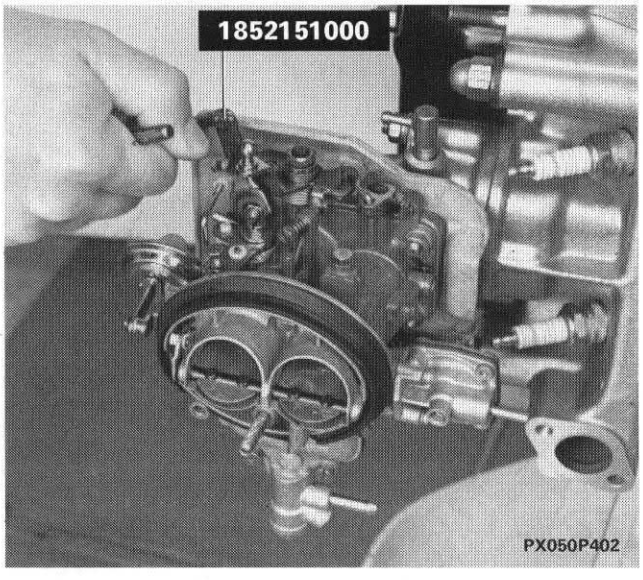


Installation of carburettor gaskets and plate

10.



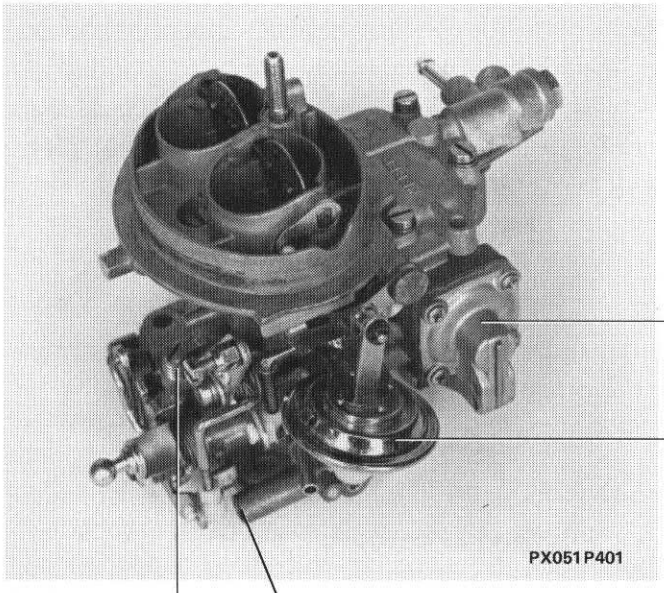
Installation of carburettor with engine on bench



Removal - installation of carburettor with engine on car

Use 10 mm wrench no. 1852151000 if carburettor is to be removed when engine is in car.

WEBER 30DGF 3/150 CARBURETTOR

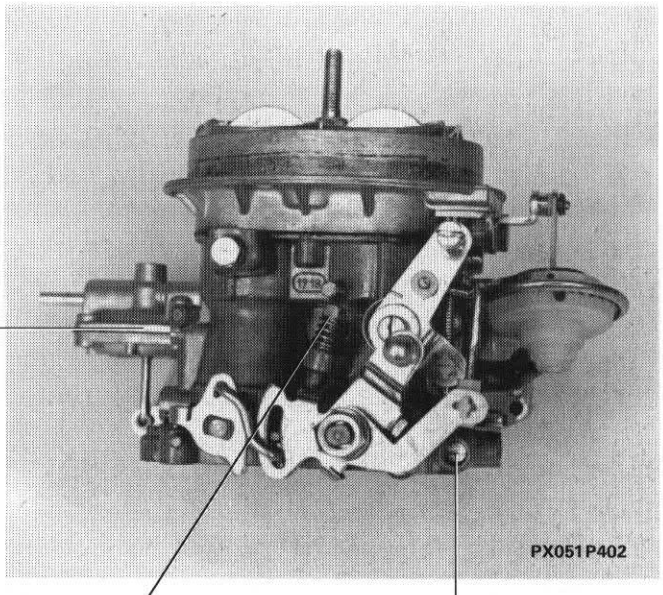


Accelerator pump

Pneumatic diaphragm

Protective cover and idle adjustment screw

Primary throttle adjustment screw



Fast idle casing

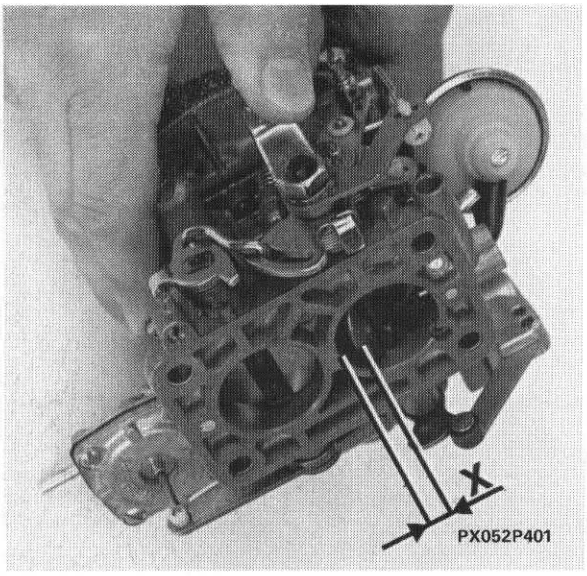
Primary throttle adjustment screw

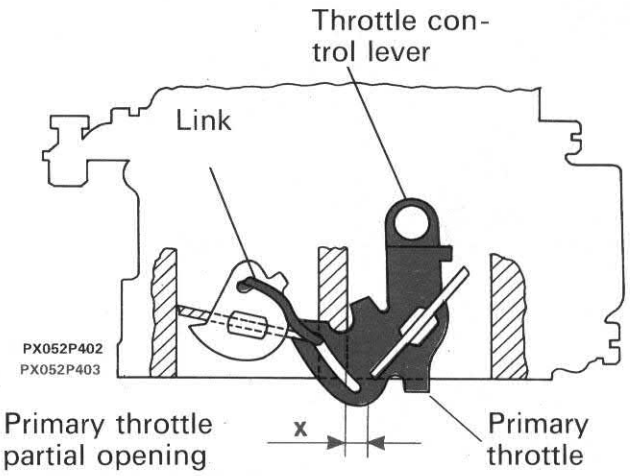
Protective cover and idle adjustment screw

NOTE *Completely disassemble carburettor, then check all adjustable parts (main jet, idle jet, emulsion tube etc.). These parts must be calibrated to values specified for the type of carburettor. To thoroughly clean all carburettor components, dip in an appropriate solvent and blow with compressed air. Do not use metal points or wire to clean jets. Renew all gaskets, seals and rings at each overhaul. Check needle valve seat seal, main throttle spindle clearance and manifold support surface flatness.*

10.

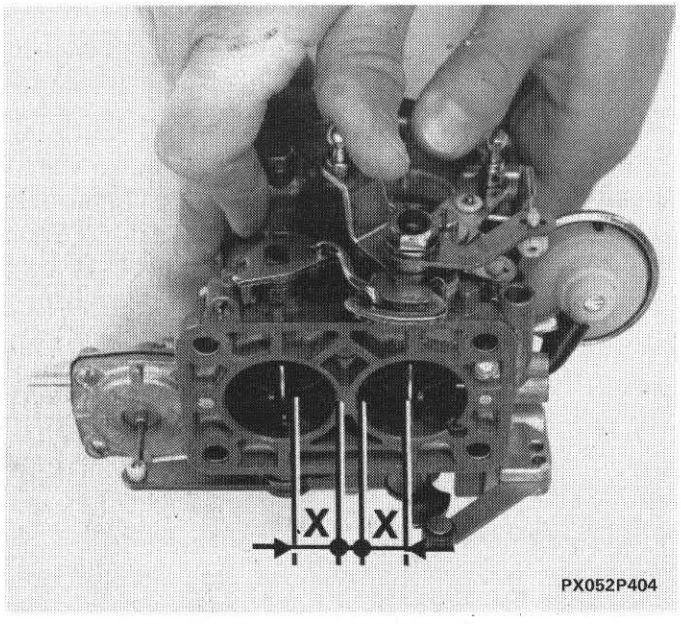
CHECKING AND ADJUSTMENT OF PRIMARY THROTTLE PARTIAL OPENING

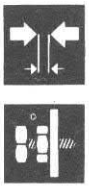


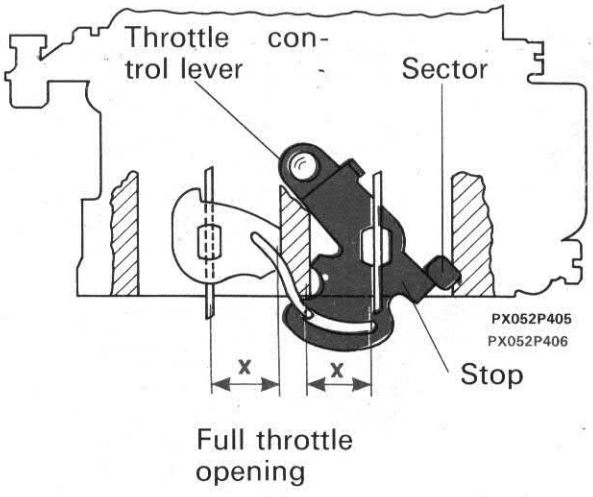


With the throttle control lever in the position indicated, i.e. in contact with the link (without forcing the link), the primary throttle should be open to a gap of 4.7 ± 0.25 mm (distance X). Adjust link as necessary if required.

CHECK FULL THROTTLE OPENING



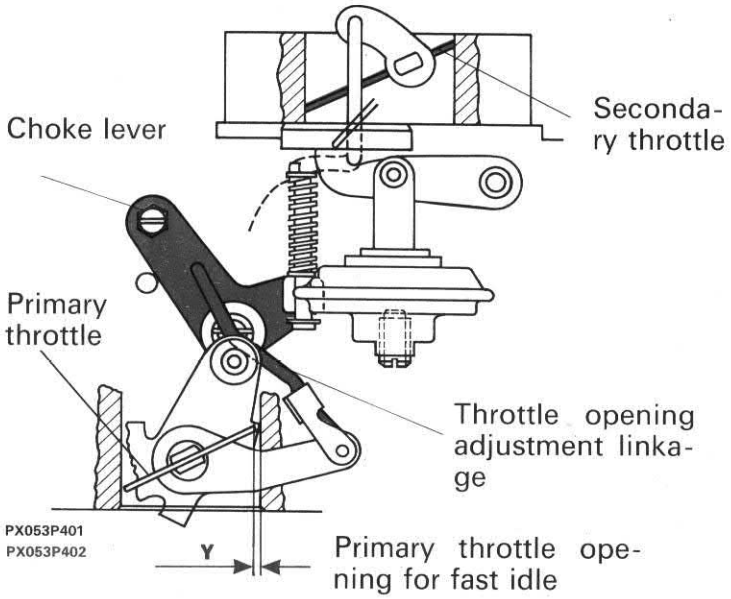


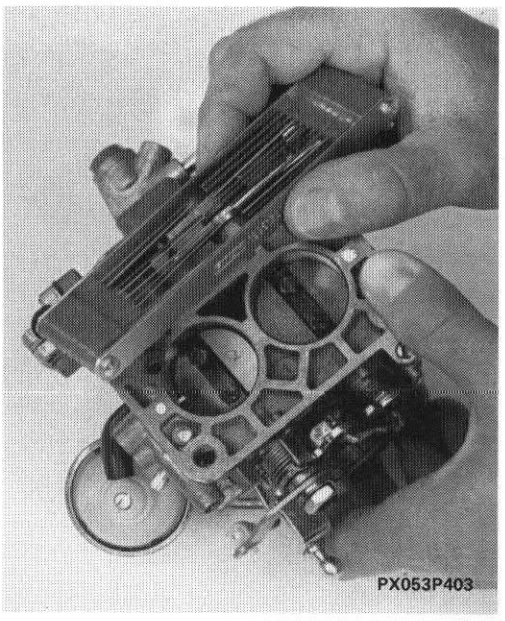


Check full throttle opening

With the throttle control lever pulled completely back until the stop rests against the sector, throttles should be fully open and leave a gap of 14 ± 0.5 mm (distance X).

MANUAL CHOKE



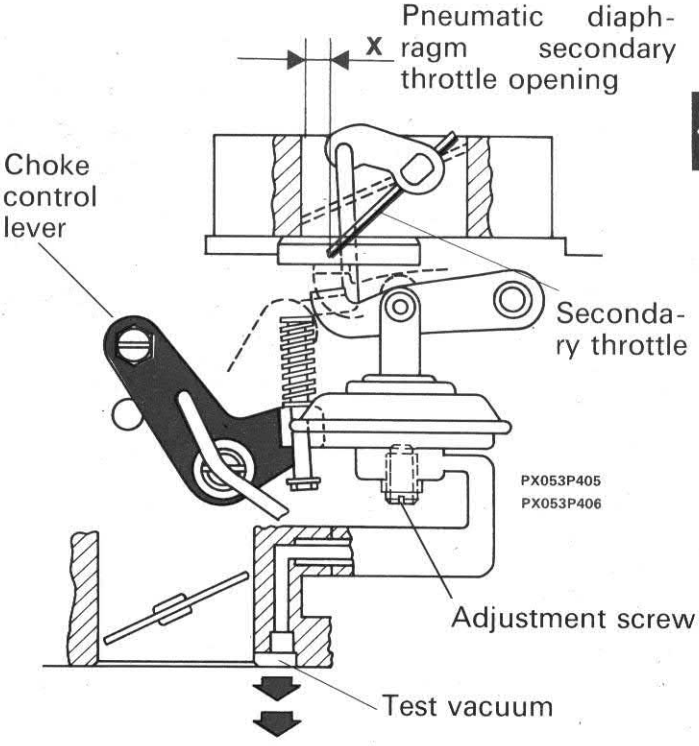


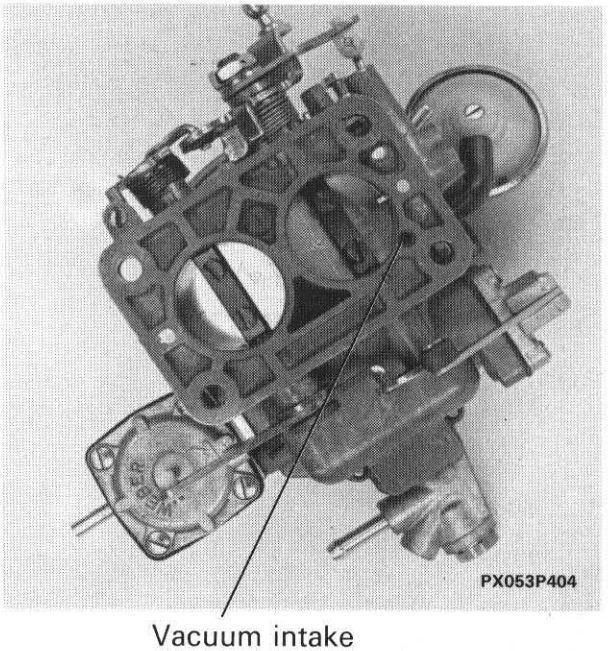
Checking and adjustment of primary throttle opening (for idle)

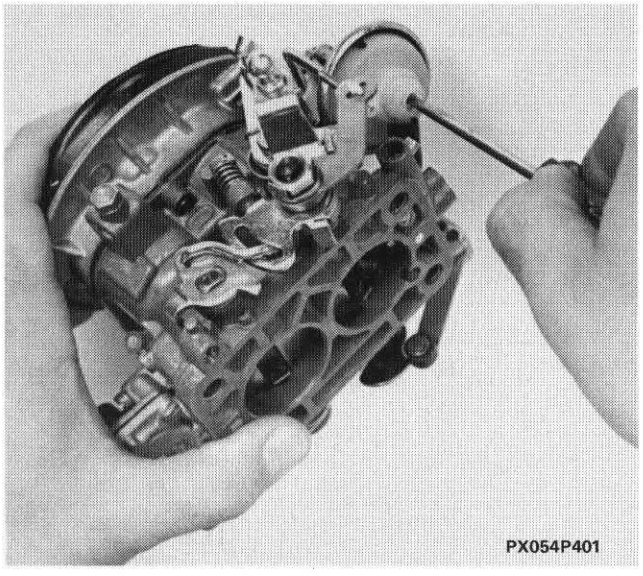
When the choke is fully out, the starter throttle should close while the primary throttle should open to a gap of 0.85 » 0.90 mm (distance Y). If the primary throttle opening is not as specified, alter the adjustment linkage.

Measure distance Y from the side where the throttle opens into the port (progression hole side).

Adjustment of pneumatic diaphragm





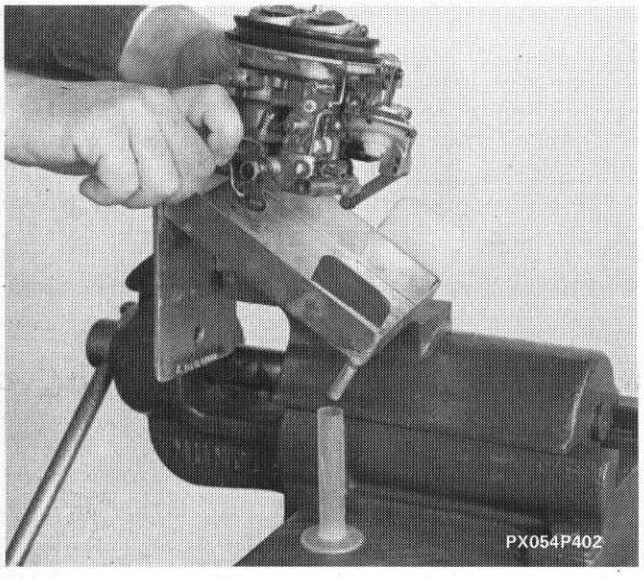


NOTE *Create a vacuum in the pneumatic diaphragm delivery port (located in the base), and check for leaks in the circuit.*
Replace the diaphragm if leaks are found.

Checking and adjustment of secondary throttle opening

When the choke control lever is pulled completely back, the secondary throttle should open to a gap of 3.5 - 4 mm (distance X) with test vacuum downstream of primary throttle. If the secondary throttle opening is not as specified, correct via the adjustment screw.

Measure the distance from the side where the throttle opens into the port.



ACCELERATOR PUMP - flow check

NOTE *Fill the carburettor float chamber with petrol and operate the main throttle lever a few times (from minimum to maximum) until the circuit is completely full and pump injector flow is even.*

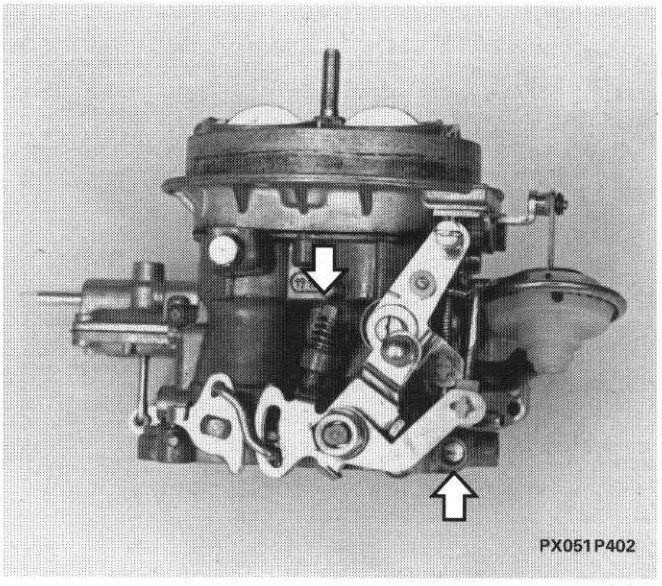
Now carry out test as follows:

- Pump 10 times. Ensure that jet ends each delivery. Leave in minimum position for a few seconds to give the pump time to fill.
- Pump capacity, i.e. the amount of petrol collected in a test tube after 10 pumps, should be 8.5 - 14 cm^3.

Petrol jet from pump nozzle should not hit the choke and centring device but emerge as vertically as possible.

ADJUSTMENT OF ENGINE IDLE SPEED AND CO CONTENT ON CAR

Carry out this adjustment after engine has warmed up (i.e. after the radiator fan has cut in for the second time) with the fan off, air filter installed and choke fully in.

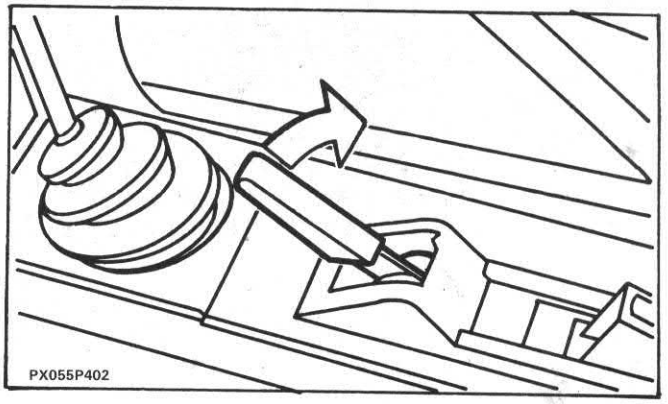


Adjust as follows:
- introduce the exhaust gas analyser probe into the exhaust tail pipe;
- fit the revolution counter;
- remove the idle mixture adjustment screw protective cover, if present;
- adjust engine to a speed of 850 ± 50/min using the main throttle adjustment screw;
- adjust mixture composition with the idle mixture adjustment screw until engine turns smoothly. Check that CO (carbon monoxide) exhaust emissions are between 0.5% - 1.5%;
- adjust the two screws until values are as specified:
- fit a new idle mixture adjustment screw cover of a different colour to the original.

COLD STARTING PROCEDURE

Start the engine without depressing the accelerator pedal.
Pull the clutch fully out (a ratchet device holds it in the required position) and start the engine

The ignition switch is fitted with an anti-repeat device. If the engine fails to start, the key must therefore be returned to the STOP position before attempting to start the car again.



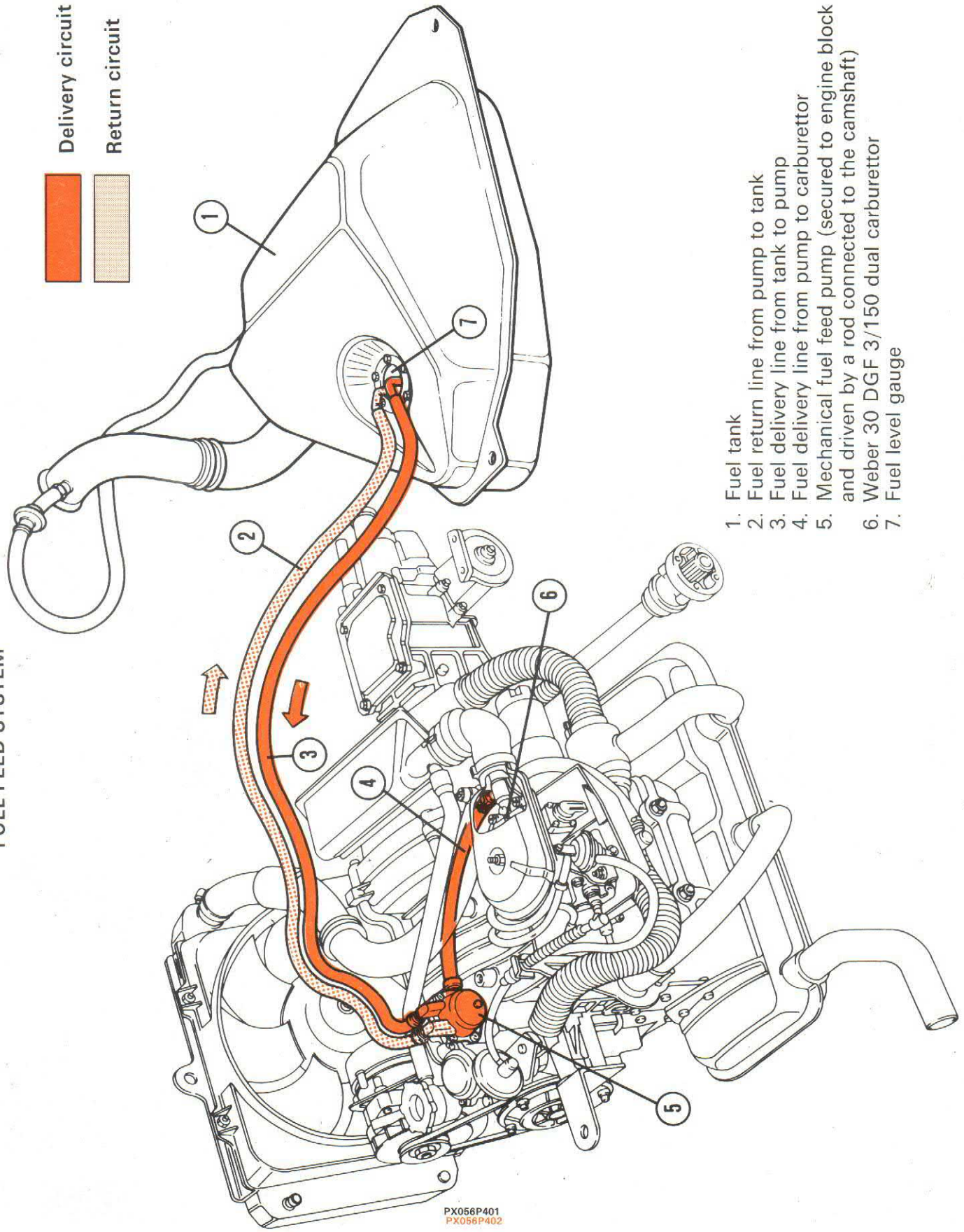
a) With outside temperature above 20°C

- 20 seconds after starting, lower the choke lever by about 1/3 of its travel;
- after 30-40 seconds, lower the choke lever by about 2/3 of its travel;
- put choke fully back in after about 2 minutes.

b) With outside temperature below 20°C

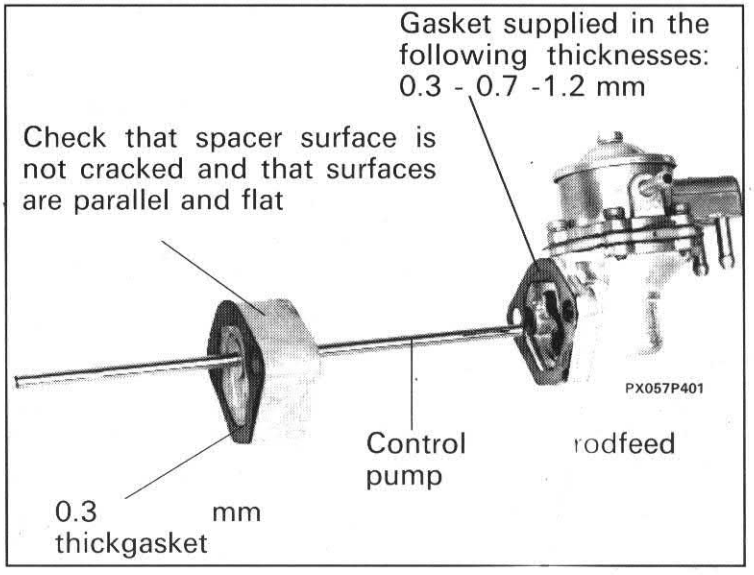
- 30 seconds after starting, gradually lower the choke lever at a rate depending on outdoor temperature until device is fully in.

FUEL FEED SYSTEM



1. Fuel tank
2. Fuel return line from pump to tank
3. Fuel delivery line from tank to pump
4. Fuel delivery line from pump to carburettor
5. Mechanical fuel feed pump (secured to engine block and driven by a rod connected to the camshaft)
6. Weber 30 DGF 3/150 dual carburettor
7. Fuel level gauge

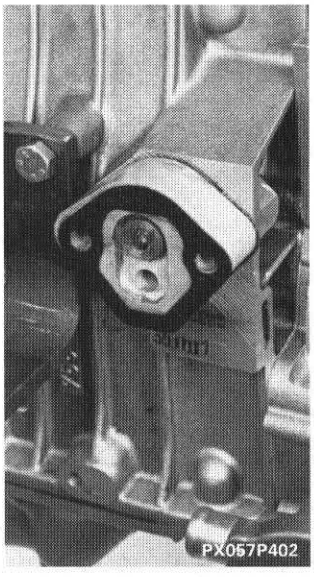
FEED PUMP

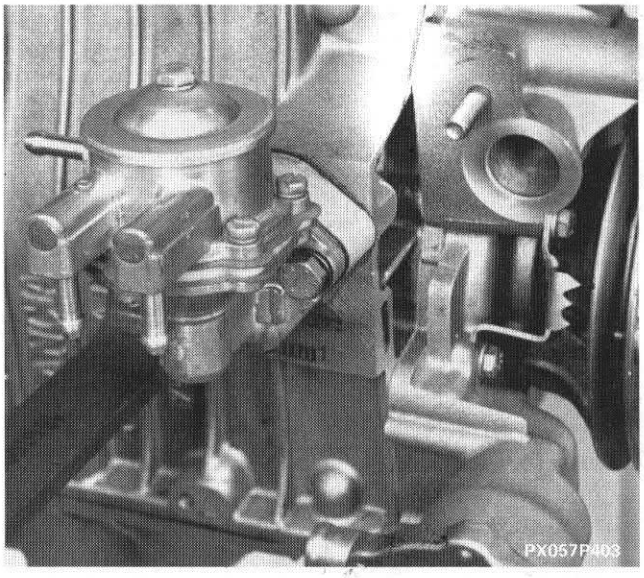


Checking feed pump, spacer and gaskets

NOTE *Although petrol leakage may be corrected by tightening outer pump housing screws, no other adjustments may be carried out and pump replacement is therefore necessary.*

Installation of gaskets, spacer, rod and feed pump on engine

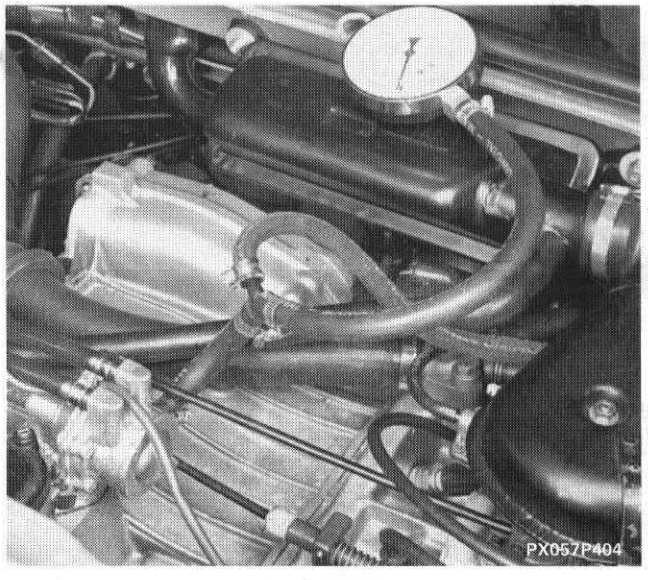




Checking feed pump delivery pressure (engine on car)

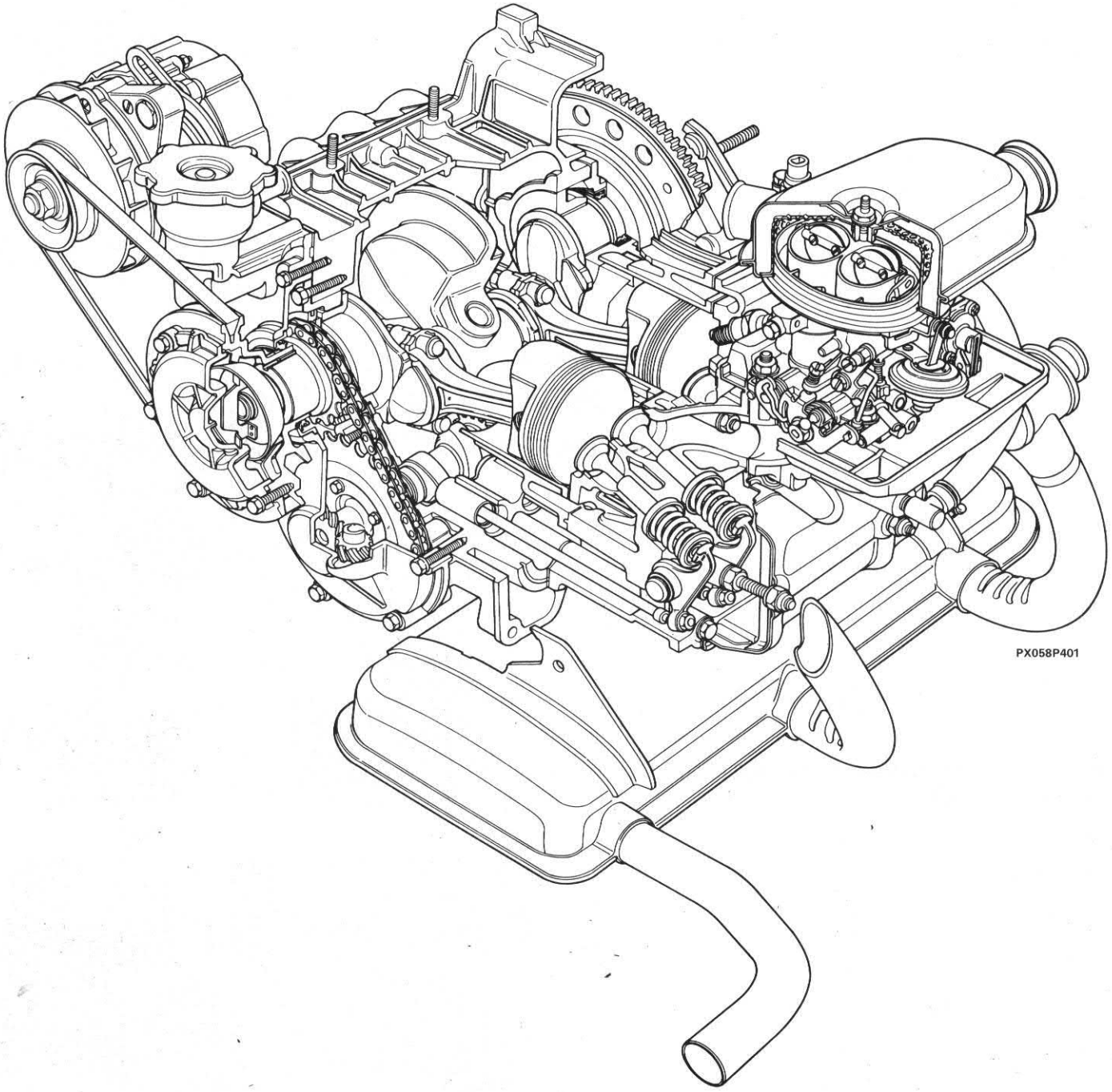
Feed pressure must be between 0.107-0.200 bar (0.10-0.21 kg/cm²) at an engine speed of 4000 rpm.

NOTE *If pressure is higher than specified, replace gasket between pump and spacer with a thicker version. If pressure is lower than specified, fit a thinner gasket.*



10.

CUTAWAY VIEW OF ENGINE



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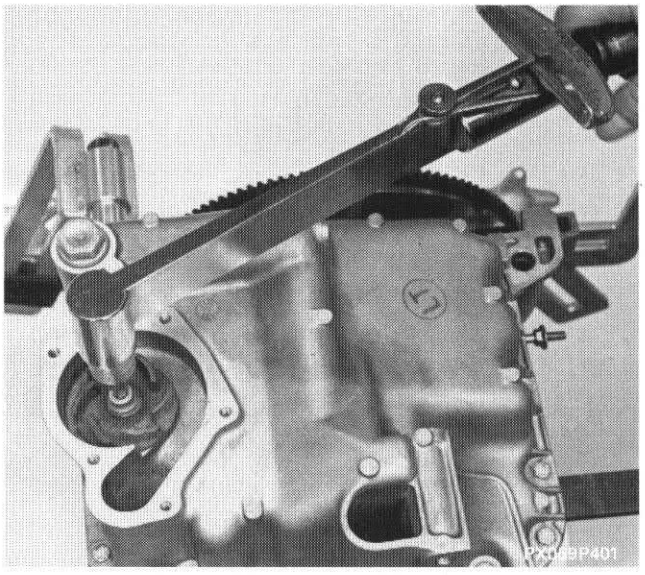
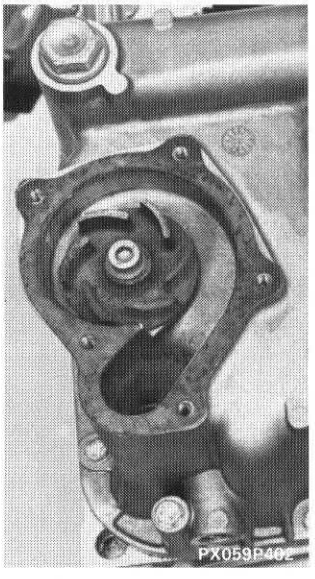
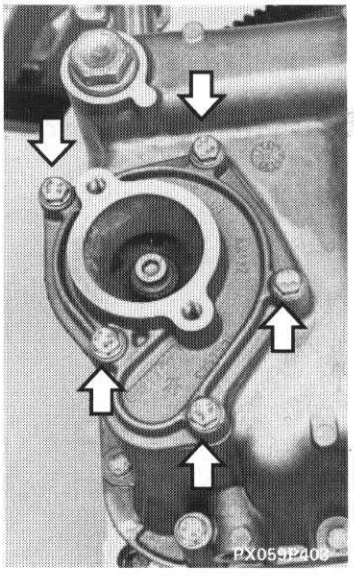
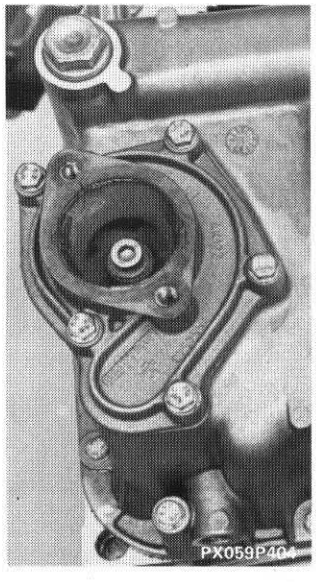


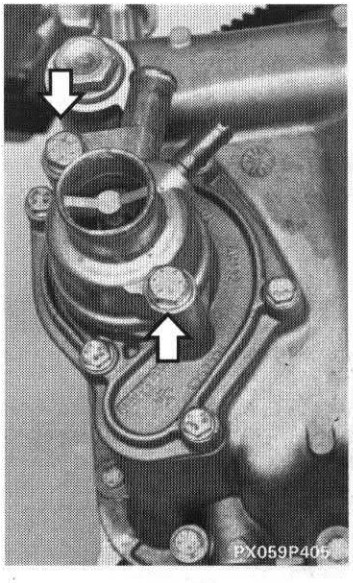
Installation and torque tightening of coolant pump impeller on accessory shaft





Installation of gasket and coolant pump cover on oil sump

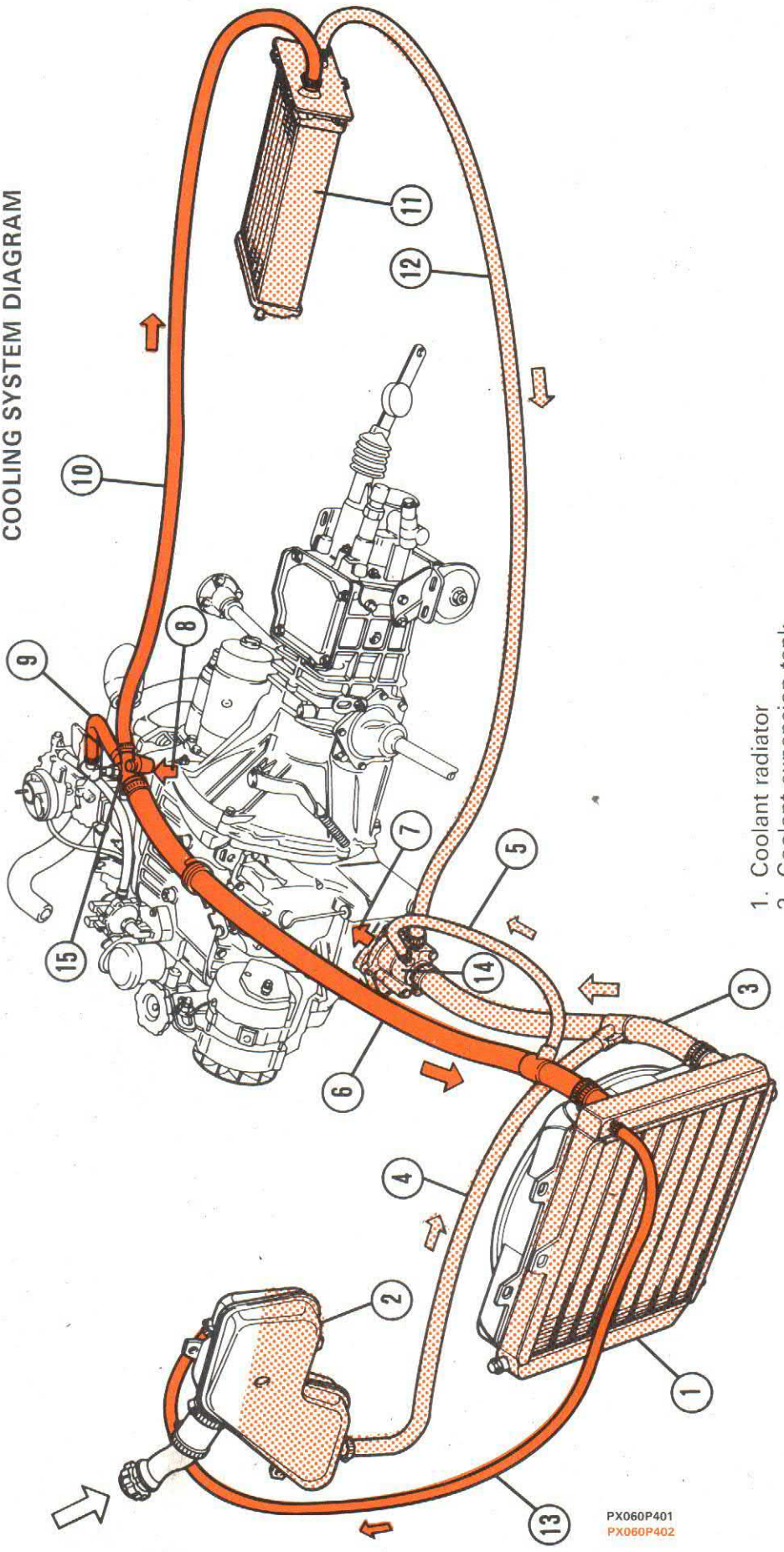




Installation of gasket and thermostat on coolant pump cover

10.

COOLING SYSTEM DIAGRAM



1. Coolant radiator
2. Coolant expansion tank
3. Coolant delivery line from radiator to pump
4. Coolant delivery line from expansion tank to pump
5. Coolant recycle line from cylinder head to pump
6. Coolant delivery line from cylinder head to coolant radiator
7. Coolant outlet from pump to engine block
8. Coolant intake from cylinder head
9. Coolant delivery line from cylinder head connector to intake manifold
10. Coolant delivery line from cylinder head connector to car interior radiator-heater
11. Car interior radiator-heater
12. Coolant delivery line from car interior radiator-heater to thermostat
13. Coolant delivery line from coolant radiator to expansion tank
14. Thermostat with by-pass for coolant mixing
15. Cylinder head connection

Delivery circuit

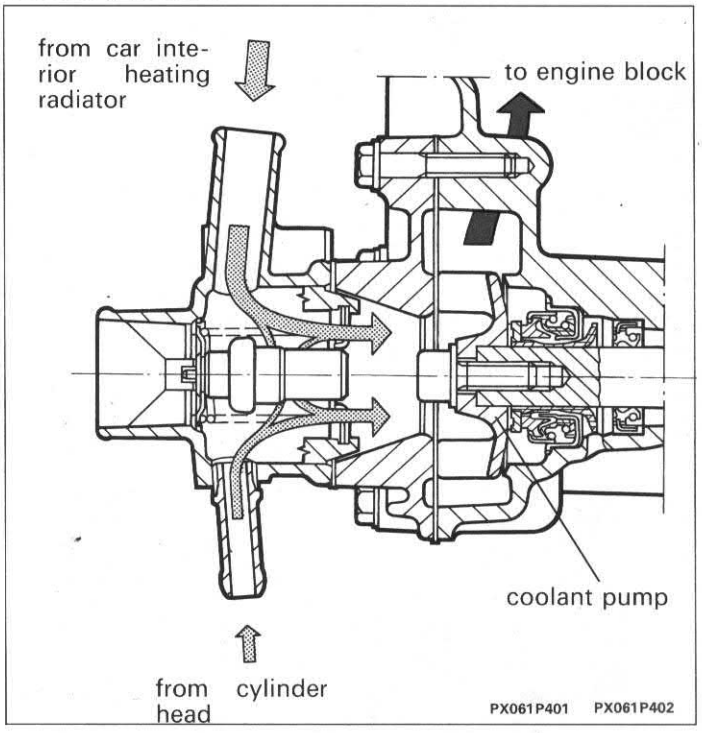
Return circuit

BY-PASS THERMOSTAT OPERATING DIAGRAM

Engine cold

The cooling system is pump driven with an built-in expansion tank and vane impeller pump
When the coolant is at a temperature below 85°- 89°C, the thermostat is completely closed from the radiator end. The pump therefore takes coolant from the cylinder head (via the recycle line) and directs it to the engine block (through ducts in the oil sump), where it is heated. Under these conditions the coolant circulates only from the cylinder head to the engine block.

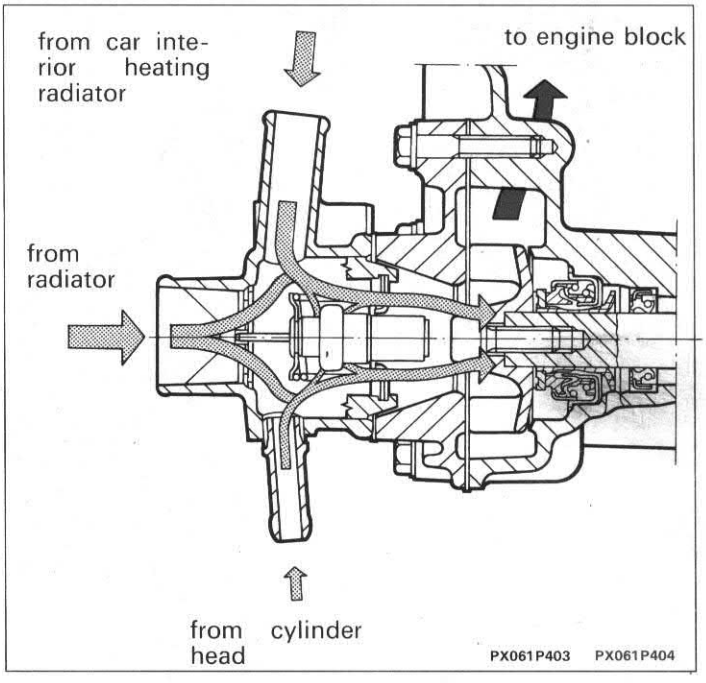
Closed position



Engine hot

When the coolant temperature exceeds 89°C the thermostat starts to open, including the part connected to the radiator. The pump can therefore suck up coolant from the bottom of the radiator and the expansion tank.
This therefore causes the coolant to circulate directly from the cylinder head to the top of the radiator. The relatively cooler coolant from the bottom of the radiator, radiator tank and expansion tank is drawn up by the impeller pump. The system therefore exerts a maximum cooling effect.

Fully open position

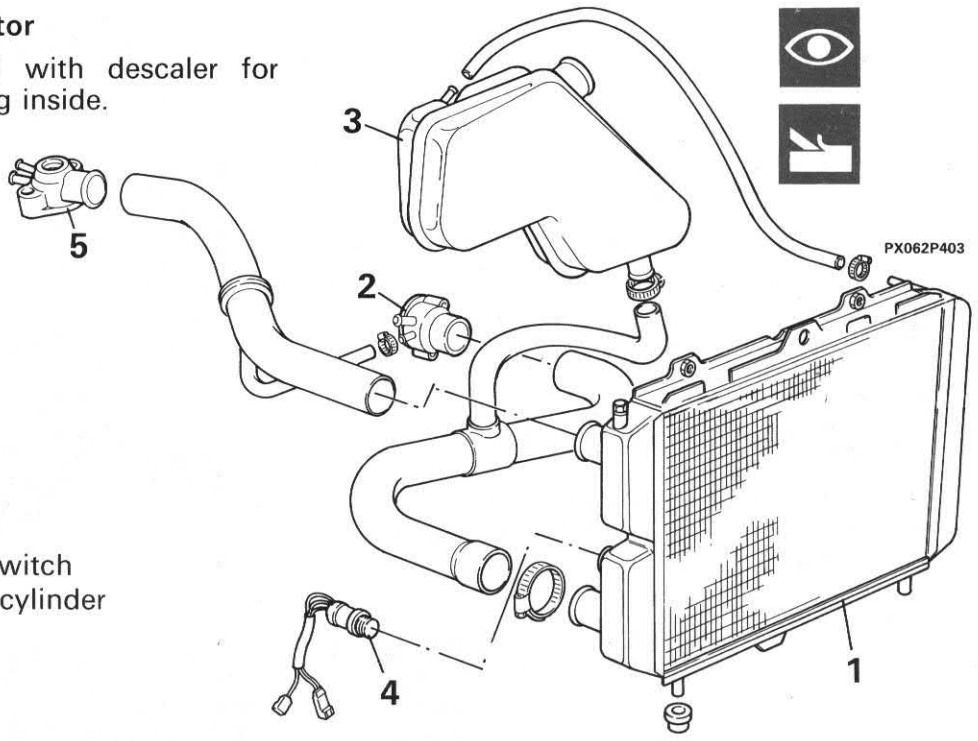


The two-stage electric coolant fan then cuts in at temperatures of 96°- 100°C and 101°- 105°C (measured at the bottom of the radiator), to trigger the cooling action of the system.

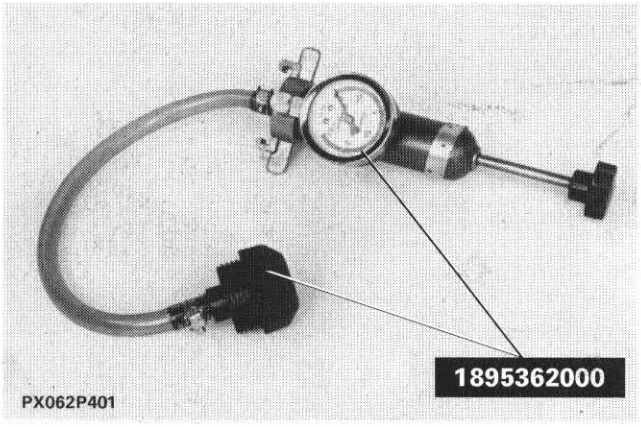
10.

Cleaning and descaling radiator

Follow instructions supplied with descaler for washing outside and descaling inside.

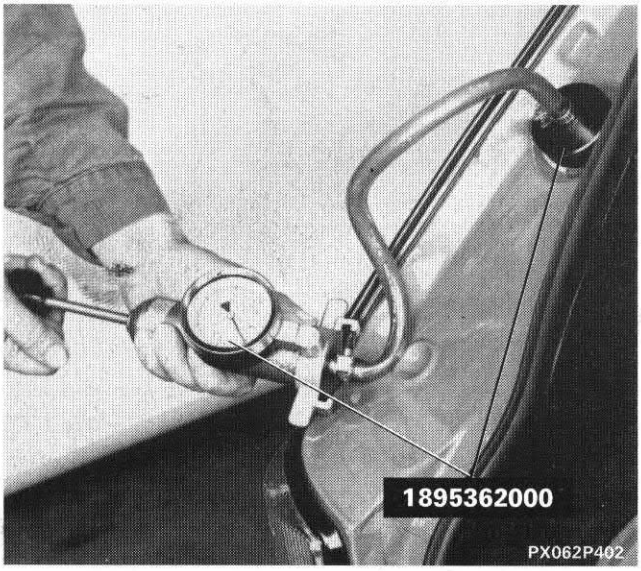


1. Radiator
2. Thermostat
3. Coolant expansion tank
4. Radiator fan thermostatic switch
5. Three-way connector on cylinder head



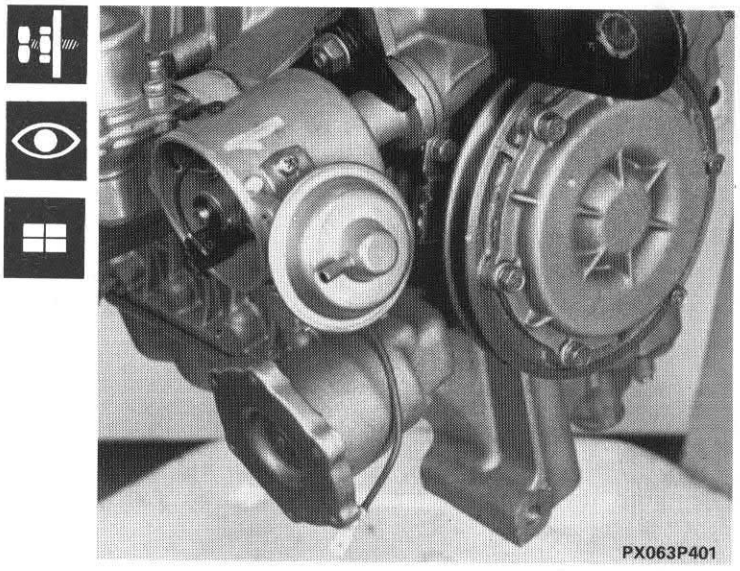
Checking radiator cap discharge valve

Should open at a pressure of 0.98 bar (1 kg/cm²).



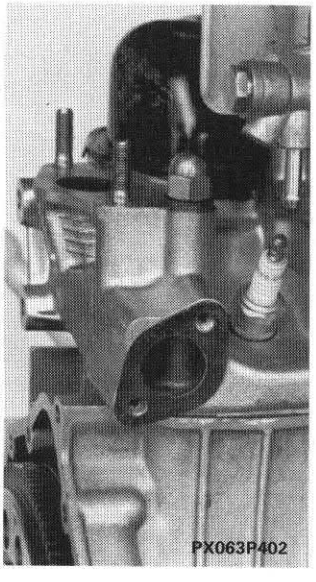
Coolant system pressure leak test

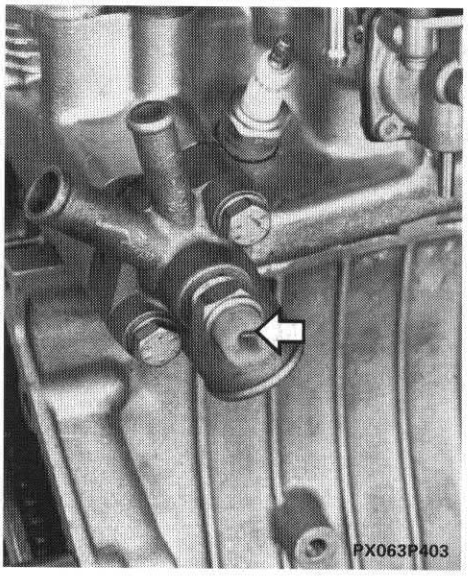
Pump to obtain a pressure of 0.98 bar (1 kg/cm²) and check for coolant leakage.



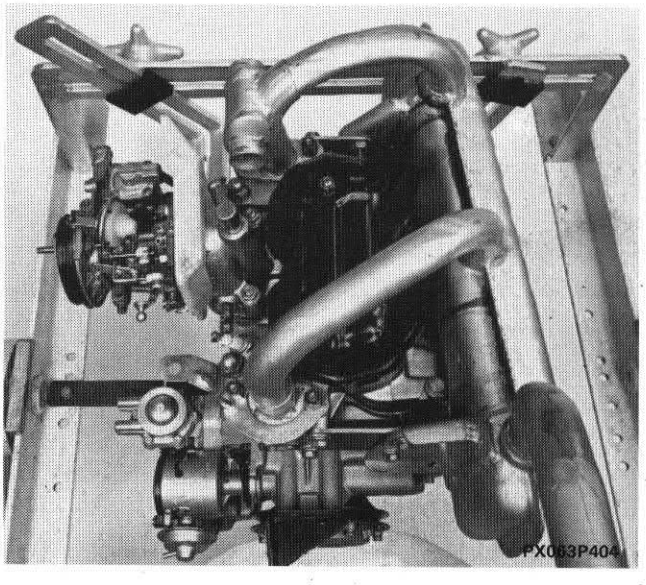
Installation of ignition breaker and timing adjustment

Position crankshaft so that pulley notch is aligned with notch on plate (indicating 10° advance).Then connect ignition breaker to engine, ensuring that contacts or platinum plated points are starting to open. Now tighten the retaining bolt.



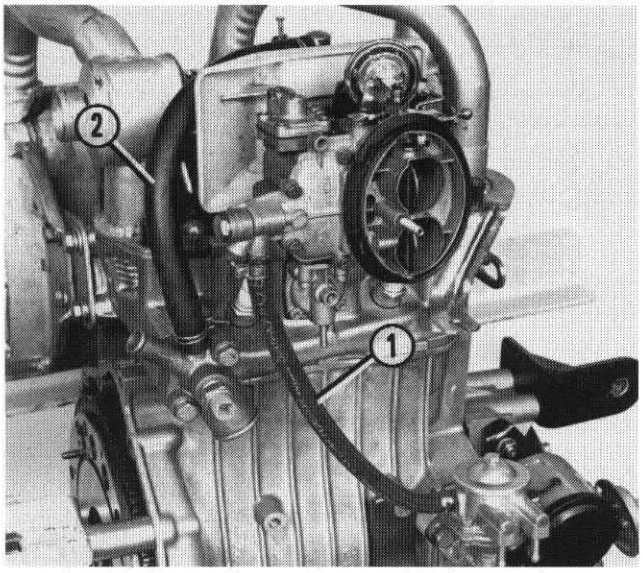


Install gasket and coolant outlet (complete with temperature sender unit) on cylinder head.



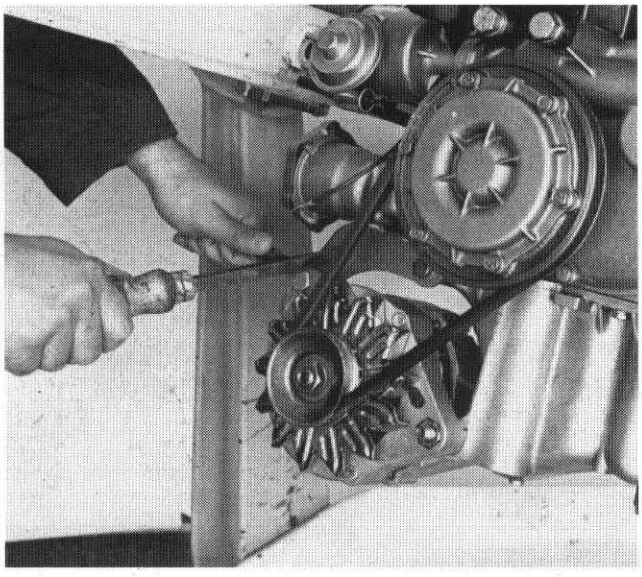
Install exhaust manifold

10.

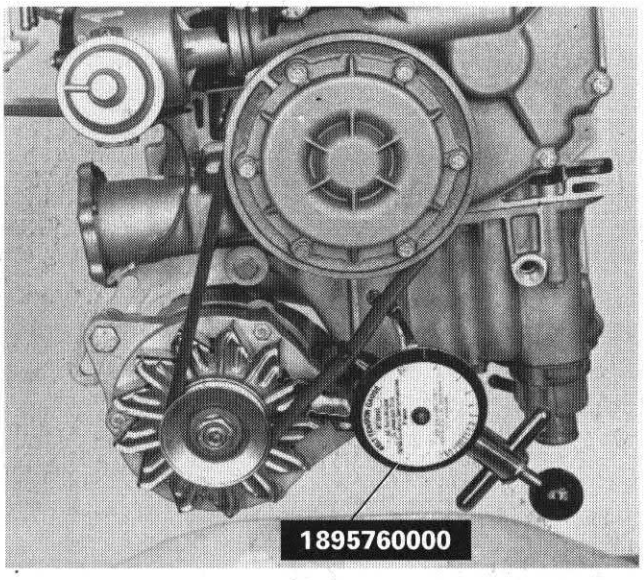


Install fuel delivery line (1) from pump to carburettor

Install coolant delivery line (2) from cylinder head outlet to intake manifold



Installation of alternator and adjustment of drive belt



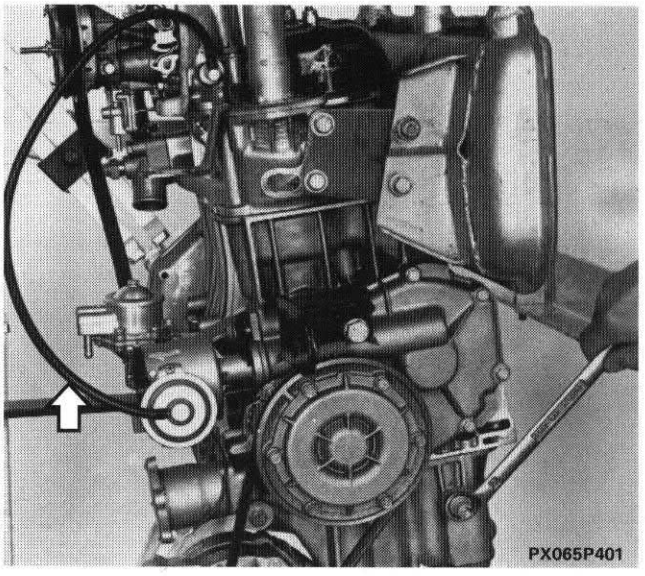
ADJUSTMENT OF ALTERNATOR DRIVE BELT TENSION

Install new belt at a tension of 40 - 50 kg, measured using tool 1895760000 or tool 1895762000.
Run engine at 3000 rpm for 15 minutes.
Leave the engine to cool for 15 minutes.
Adjust belt tension to 40-50 kg.

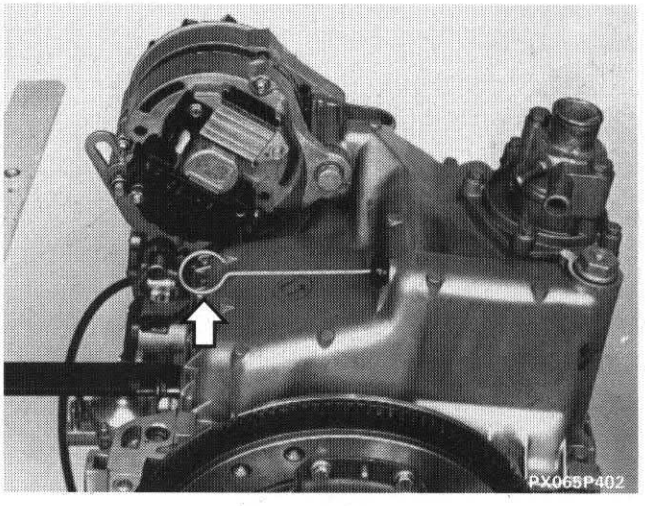
Periodic checking of tension

Check tension with tool 1895760000 or tool 1895762000. If load is $\leqslant$ 15 kg, adjust tension to 25 - 35 kg.

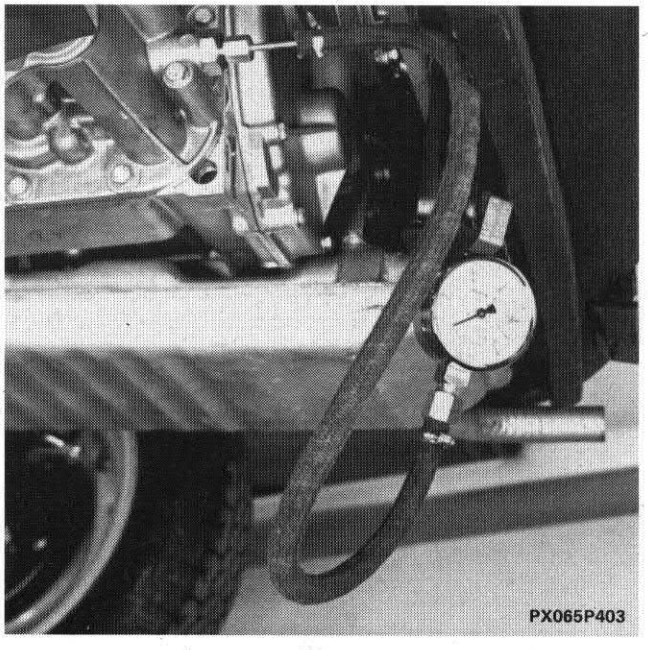
Tension must be checked with engine cold.



Installation of vacuum advance corrector and installation of low oil pressure switch



Installation of oil dipstick



Checking oil pressure at 100°C

Lubrication pressure must be between 2.94 - 4.8 bar.

Install threaded connector in place of low oil pressure warning switch

10.A

1840051000 Cylinder head extractor
1840206000 Percussion extractor (use with special parts)
1840207812 Part (∅12-14 mm) for crankshaft bush removal
1840207813 Part (∅14-18 mm) for coolant pump packing box and oil seal removal (use with 1840206000)
1850089000 Rocker shaft support retaining bolt lock bush
1850117000 Valve rocker adjustment screw wrench
1860158000 Support for cylinder head during valve assembly and disassemblly
1860161000 Flywheel clamp (bench)
1860162000 Pressure gauge with connector for oil pressure check (scale 0-9.81 bar)
1860183000 Pliers (∅75-110 mm) for piston ring removal and installation
1860212000 Driver for crankpin assembly and disassembly
1860213000 Driver (∅20 mm) for crankpin bush assembly and disassembly
1860395000 Driver for valve guide removal and installation
1860449000 Pair of threaded journals for flywheel operation during timing check
1860470000 Stand for cylinder head during overhaul
1860490000 Clamp for leak testing of valves 1895868000 (use with 1860470000)
1860592000 Multi-purpose hook for engine-gearbox unit lifting and transport
1860605000 Collar (∅60-125 mm) for insertion of normal and oversize pistons in cylinders
1860644000 Valve removal and installation tool
1860691000 Coupler for fitting oil seal to valve guide
1861001034 Bracket for fixing flywheel end of engine to rotary stand 1861000000
1861001036 Parts for securing engine to rotary stand 1861000000 (use with 1861001034)
1865501000 Tool for testing carburettor accelerator pump flow
1870152000 Driver for installation of coolant pump packing box
1870414000 Beam for support of engine in car during removal and attachment of rear beam
1890310000 Smoothing tool (∅8 mm) for engine valve guide holes
1890338001 Borer (∅22.05 mm) for oversize tappet guide holes
1890338002 Borer (∅22.10 mm) for oversize tappet guide holes
1895362000 Tester for coolant system leaks
1895683000 Device for checking engine cylinder compression (scale 4.05-18.2 bar)
1895683002 Cards for device 1895683000
1895762000 Torque wrench for checking rubber belts
1895868000 Device for valve leak tests

PART	Thread	Tightening torques
		daNm
ENGINE		
Camshaft and flywheel end bearing support retaining screw	M 8	2.7
Cap nut retaining cylinder head to engine block	M 10 x 1.25	4.9
Screw retaining cylinder head to engine block	M 8	3
Screw retaining cylinder head to engine block	M 9 x 1.25	4
Nut for con rod bolt	M 8 x 1	3.4
Screw retaining flywheel to crankshaft	M 8	4.4
Screw retaining driven gear to camshaft	M 6	1
Nut retaining rocker support	M 8	2.4
Screw retaining alternator drive pulley	M 24 x 1.5	14.7
Nut retaining alternator driven pulley	M 14 x 1.5	7.5
Spark plug	M 14 x 1.25	2.8
Oil pressure switch	M 14 x 1.5 (cylindrical)	3.2
Self-locking nut for cylinder head cover retaining stud	M 8	0.8
Oil drain plug	M 22 x 1.5	5
Screw retaining oil suction filter to engine sump	M 8	2.1
Screw retaining coolant pump impeller to spindle	M 8	2.1
Screw retaining coolant pump cover to sump	M 6	0.7
Screw retaining thermostat to coolant pump cover	M 8	2.5
Screw retaining sump to engine block	M 6	0.8

10.

PART	Thread	Tightening torques daNm

POWER UNIT SUSPENSION

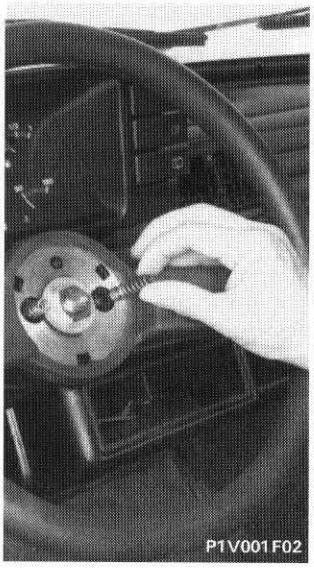
Screw retaining suspension support to body shell	M 8	2.5
Screw retaining beam to gearbox	M 8	2.5
Screw for retaining front power unit bracket	M 10 x 1.25	4.9
Screw for bracket attaching power unit to suspension	M 10 x 1.25	4.9
Nut retaining rubber block to power unit	M 10 x 1.25	4.9

ENGINE EXHAUST

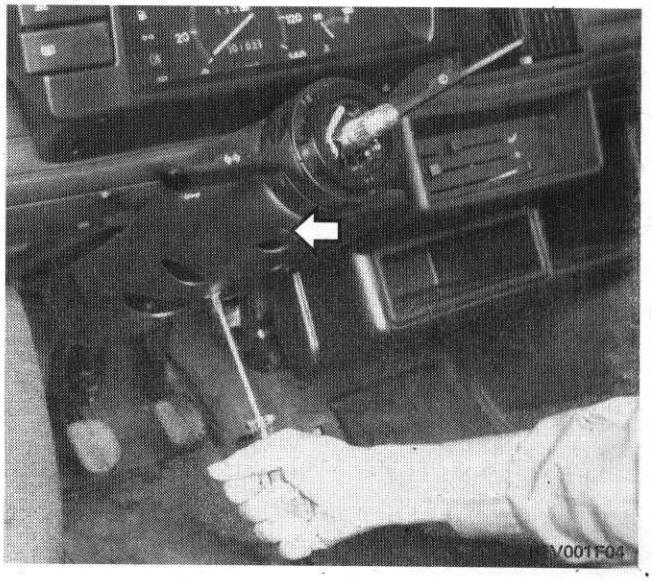
Nut retaining exhaust silencer to manifold	M 8	1.8
Screw retaining exhaust silencer support	M 8	2.4
Screw retaining exhaust silencer to engine	M 8	2.4

REMOVING-REFITTING

Removing-refitting horn control

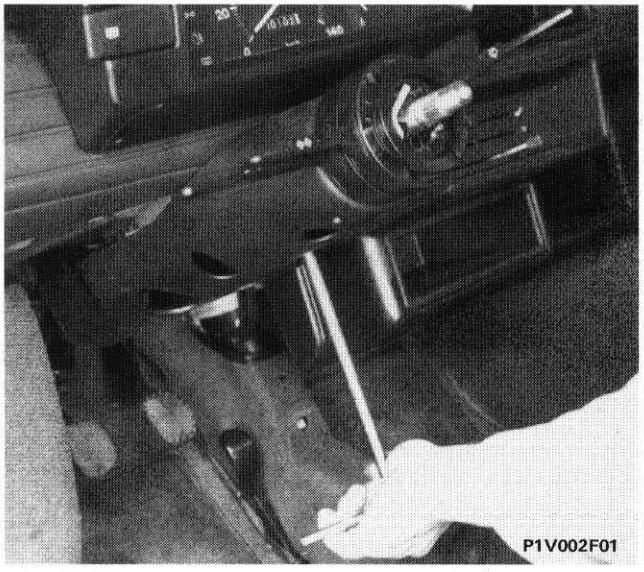


Removing-refitting steering wheel and horn control springs

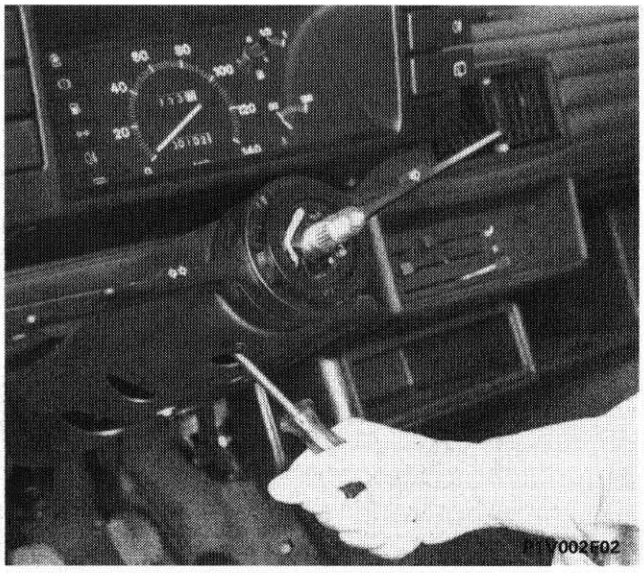


Removing-refitting bolts fixing shield to upper shaft and steering column switch unit

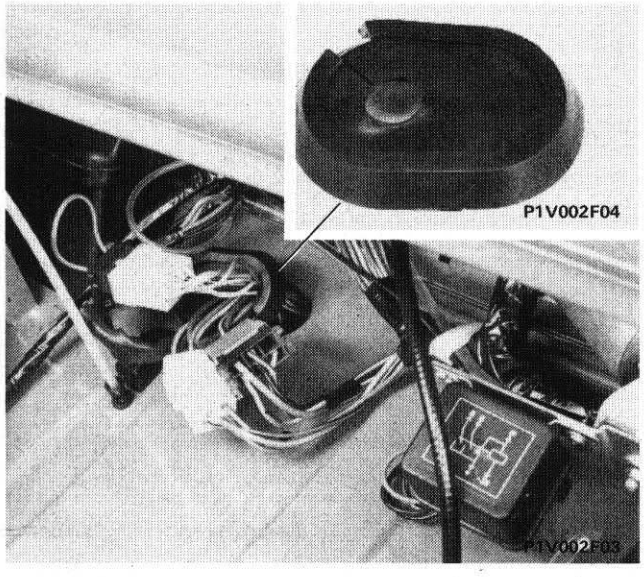
41.



Removing-refitting nut fixing shield and upper shaft to bodyshell

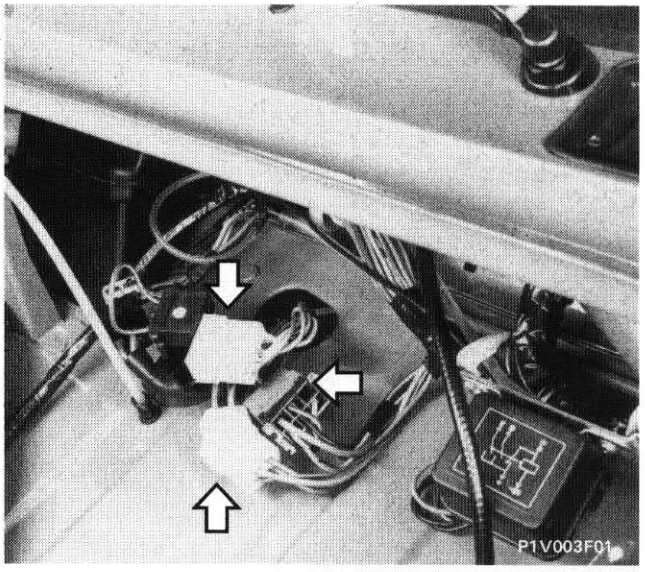


Removing-refitting steering column switch unit from upper shaft



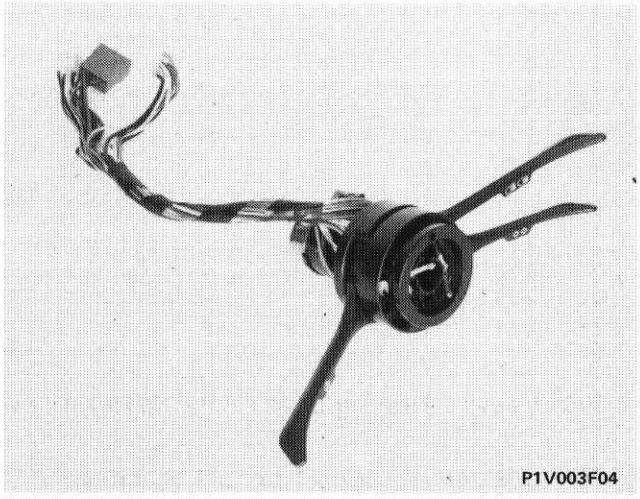
Removing-refitting electric cable loom seal

The seal can be found on the bulkhead between the passenger compartment and the engine compartment

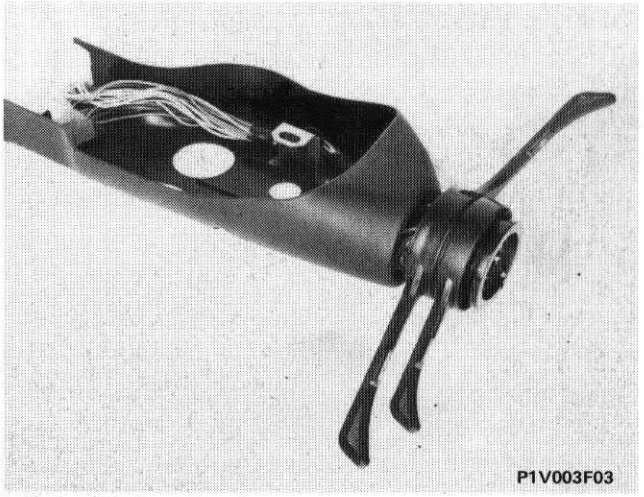


Disconnect the 3 connectors for the electrical cables which go to the steering column switch unit

Removing-refitting upper shaft and steering column switch unit cover

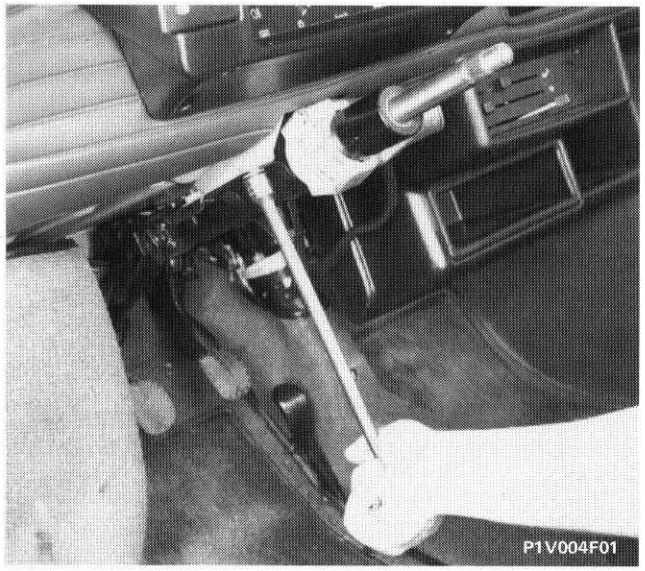


Steering column switch unit complete with electrical cables and connections

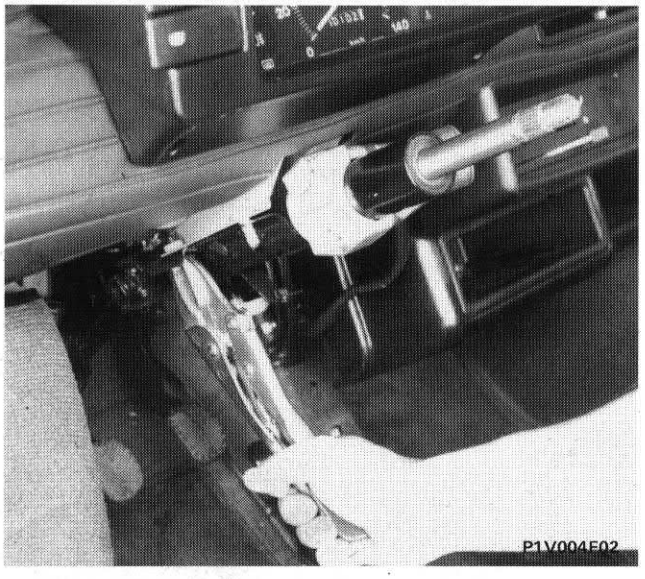


Upper steering shaft and steering column switch unit cover

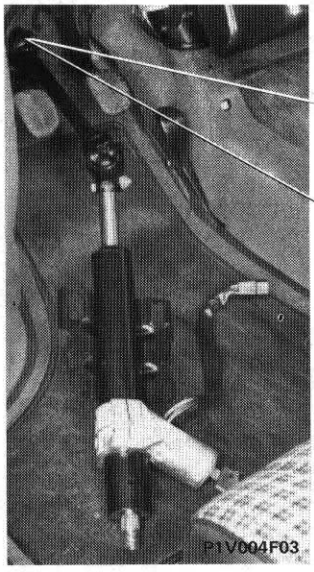
41.

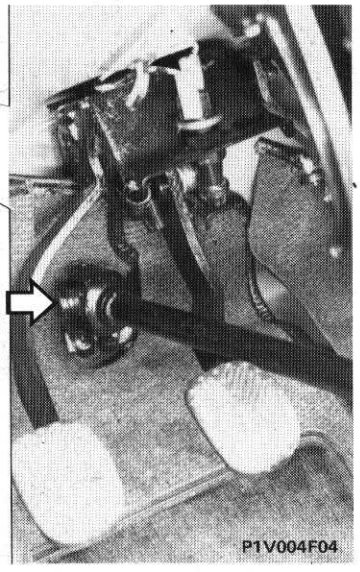


Removing-refitting nuts fixing upper steering shaft mounting to the bodyshell



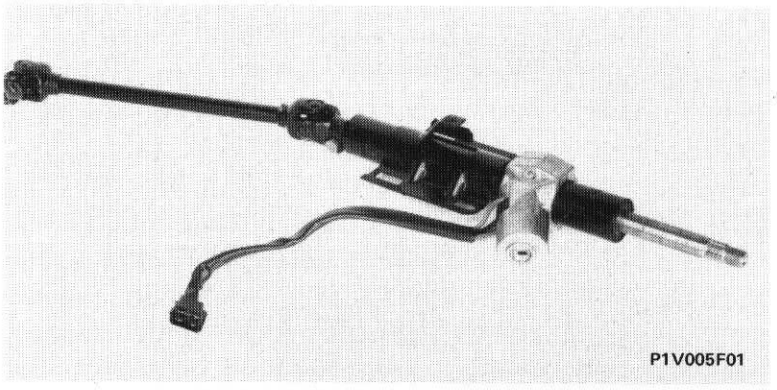
Removing bolts with pre-arranged breaking load, using automatic locking pliers and jaws



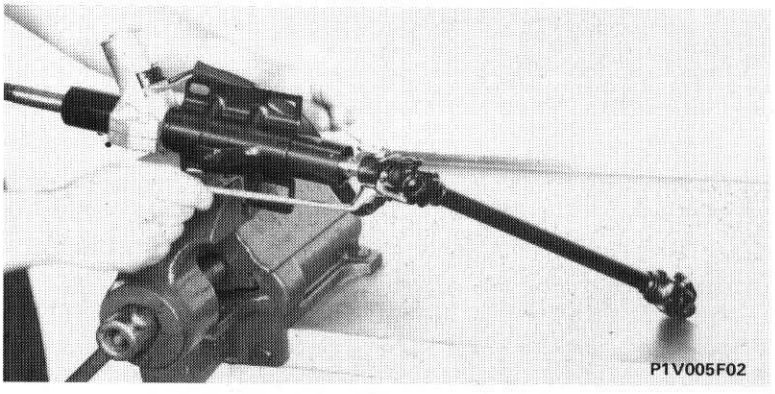


Removing-refitting lower shft from steering box pinion.

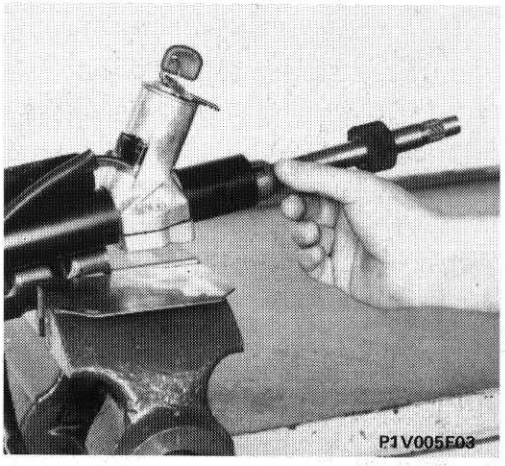
The arrow shows the nut to be undone in order to remove the lower shaft.



Steering gear

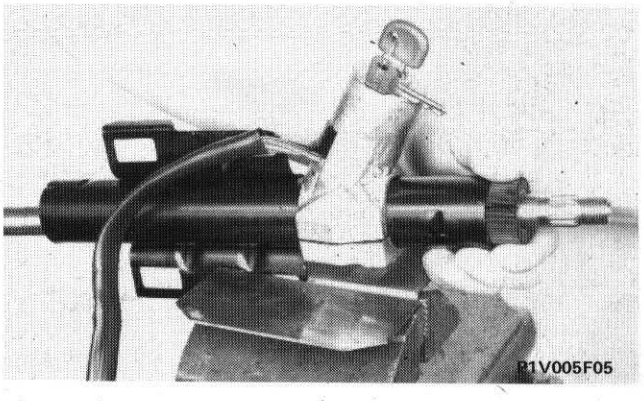


Dismantling upper steering shaft from lower shaft at the bench



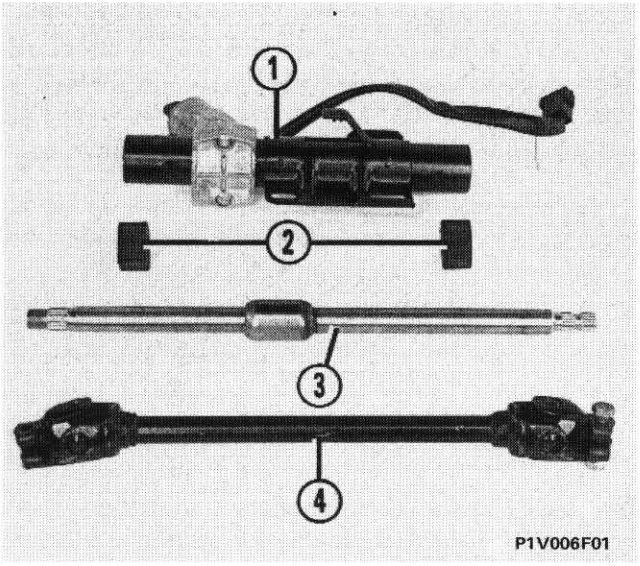
Dismantling upper steering shaft from mounting at the bench

Before removing the upper shaft and the bushes from the mounting, remove the staking on the lower steering shaft side of the mounting.



Refitting upper shaft and bushes on the mounting

41.

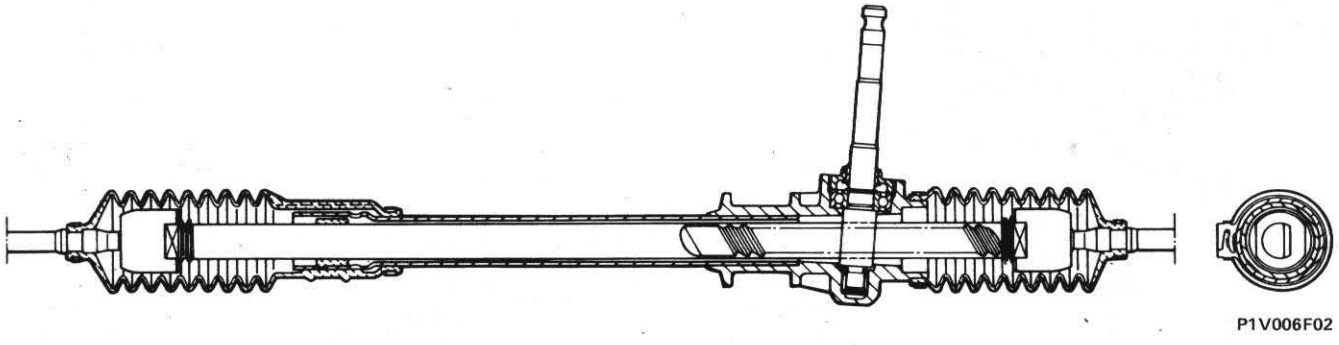


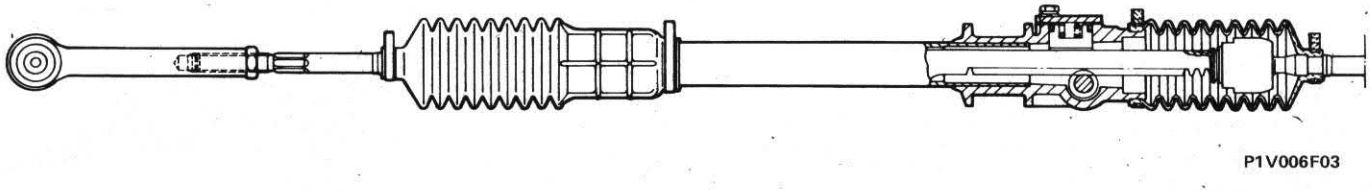
Checking steering gear components

Check that the clearance between the upper steering shaft and the flexible bushes is not too large and that the shaft is not off centre. Check that the spider clearance for the lower steering shaft universal joints is not too large. If any anomalies whatsoever are found, replace the affected components.

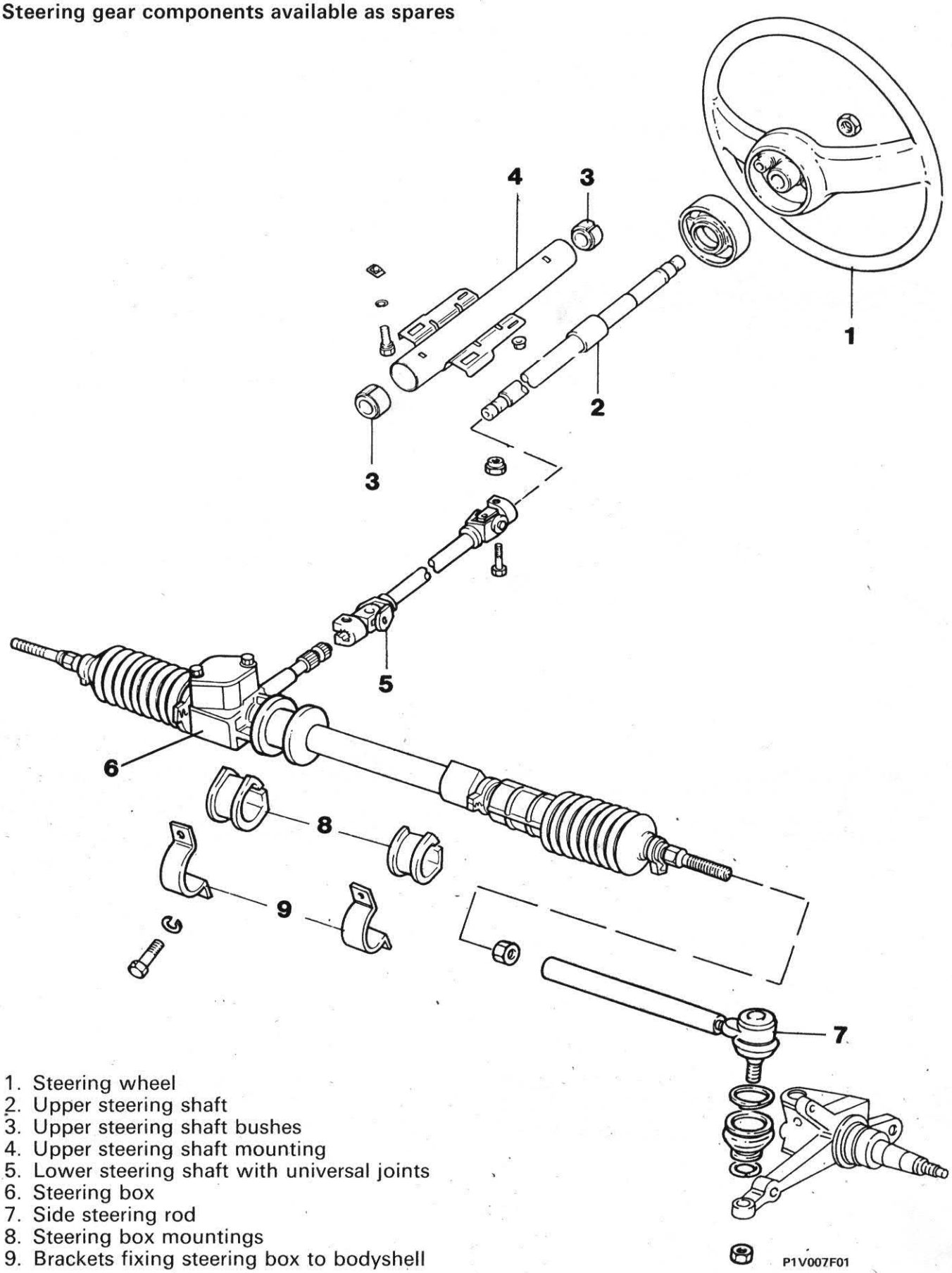
1. Upper steering shaft mounting
2. Flexible mountings
3. Upper steering shaft
4. Lower steering shaft with universal joints

Longitudinal sections of rack and pinion steering box



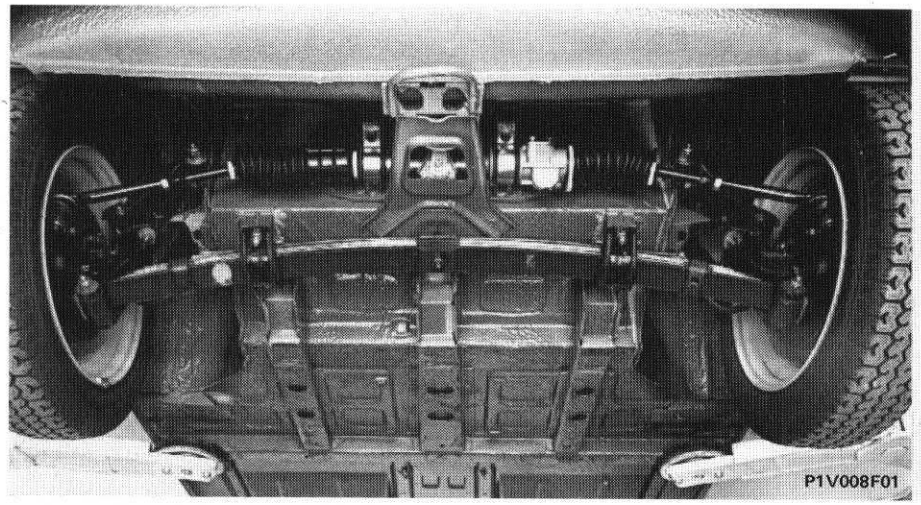


Steering gear components available as spares



1. Steering wheel
2. Upper steering shaft
3. Upper steering shaft bushes
4. Upper steering shaft mounting
5. Lower steering shaft with universal joints
6. Steering box
7. Side steering rod
8. Steering box mountings
9. Brackets fixing steering box to bodyshell

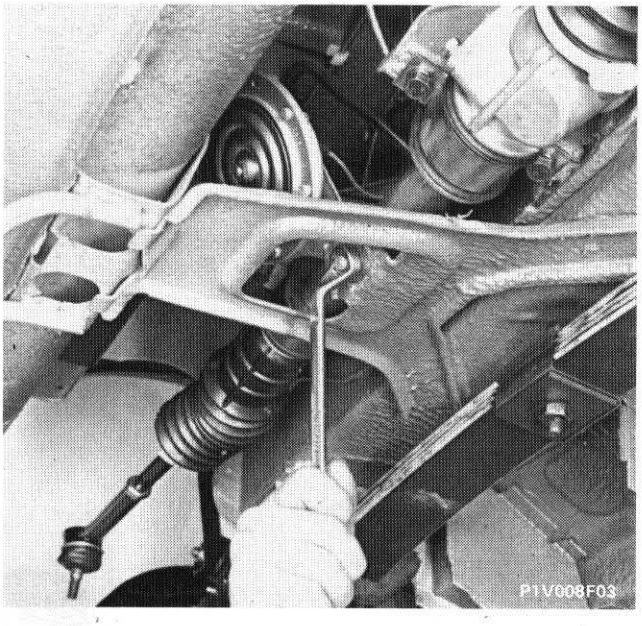
41.



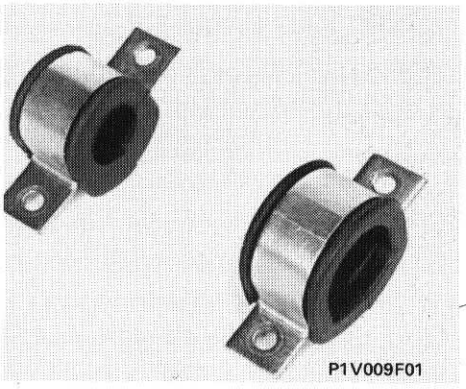
REMOVING-REFITTING

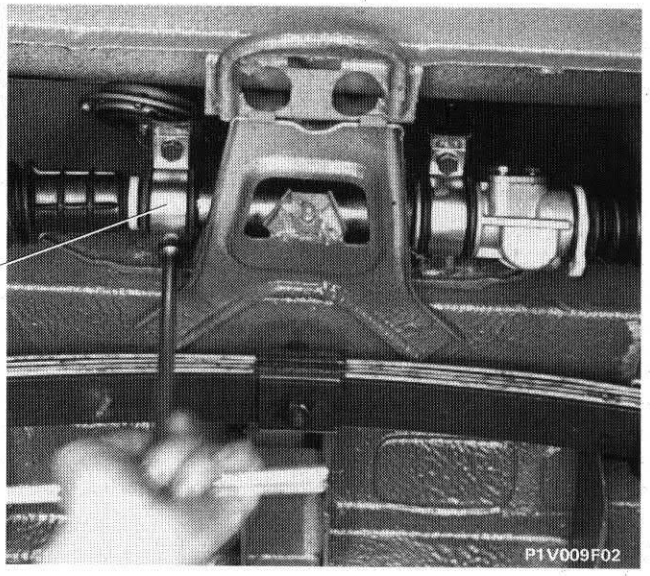
View of steering box assembly fitted on vehicle

Removing side from from steering control lever



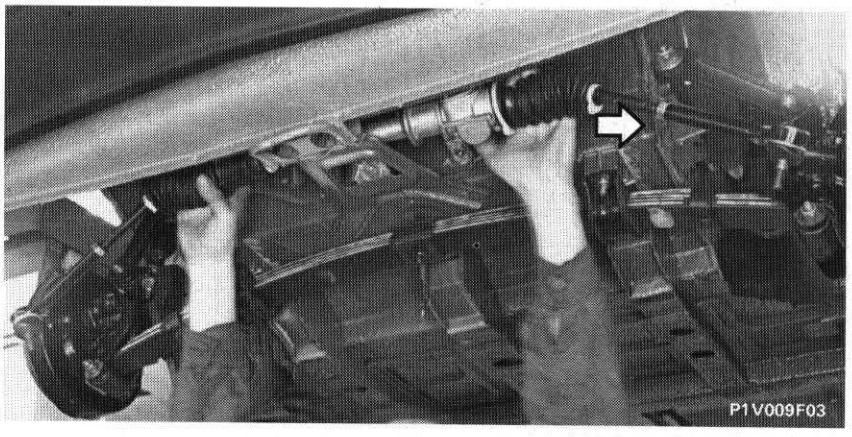
Removing-refitting horns





Removing-refitting steering box from bodyshell

The brackets and the rubber mountings have to be removed in order to carry out the removing-refitting procedure

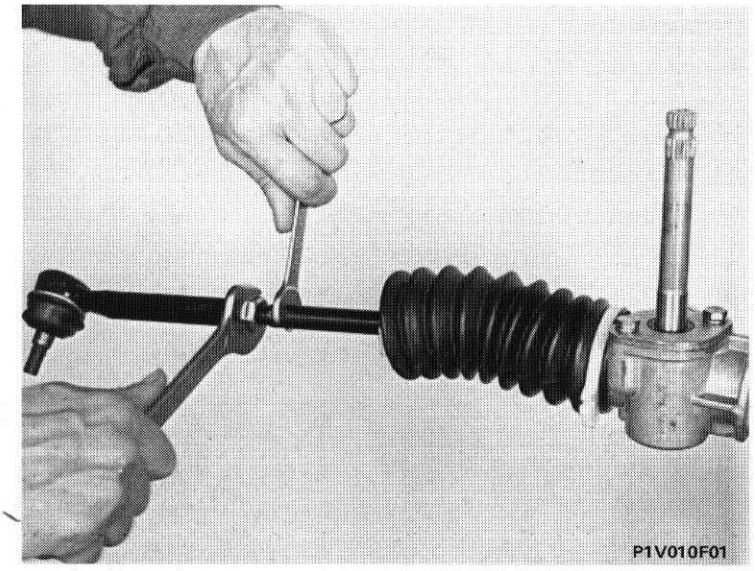


Removing-refitting steering box assembly

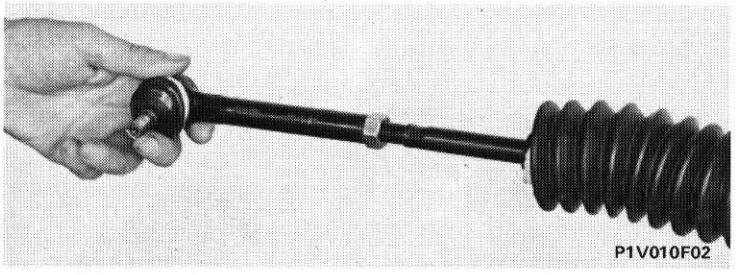
The arrow shows the left side of the vehicle where the steering box can be removed from.

Carry out the front wheel toe in each time the steering box is removed-refitted

41.

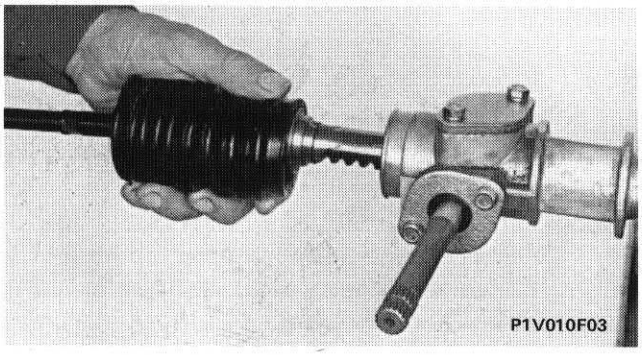


REMOVING-REFITTING



Removing-refitting rod complete with track rod end

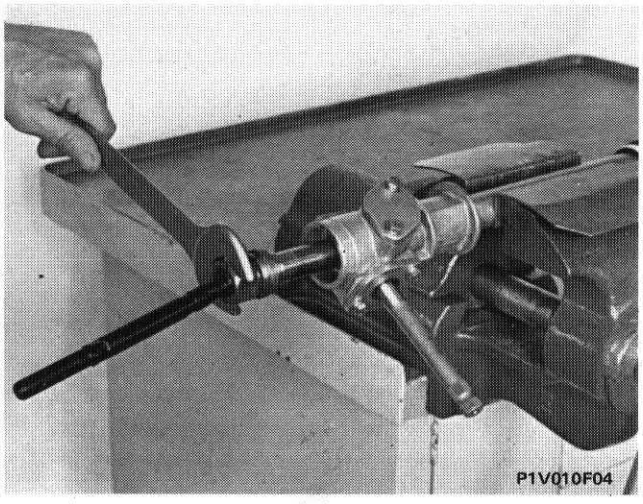
Check that there are no signs of hardening or excess clearance in the track rod end or else it must be replaced.

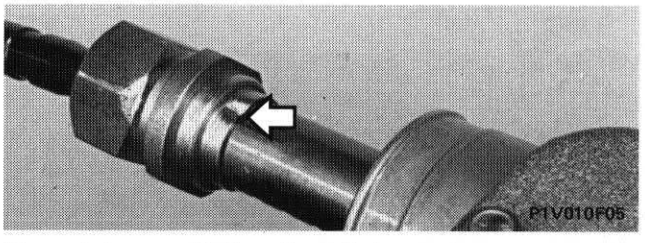


Removing-refitting protective boot and oil seal

Carefully check that there are no holes or tears in the boot or else it must be replaced.

Before fitting the last boot (pinion side), apply the recommended amount of grease.

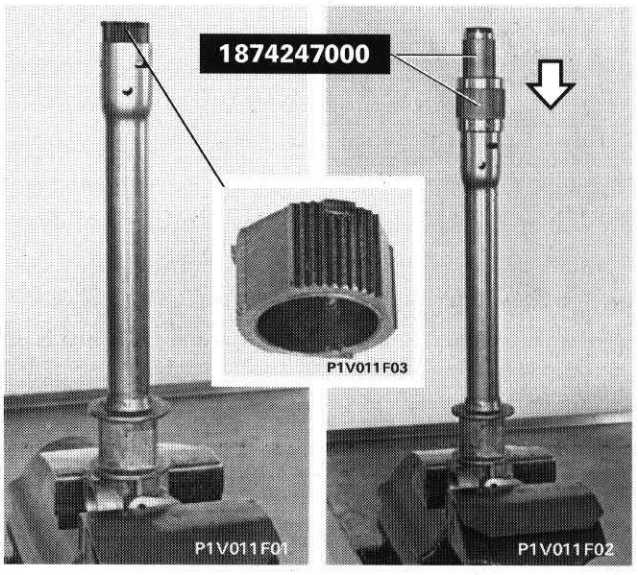




Removing-refitting ball joint

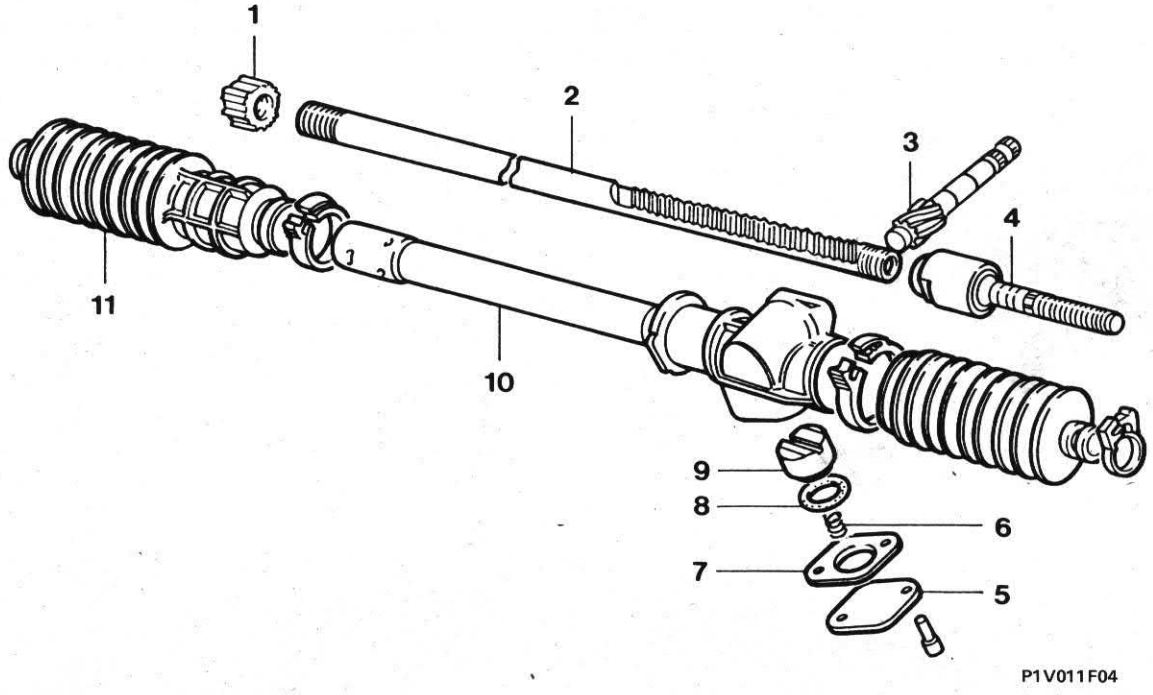
There should be no signs of hardening in the ball joint but it should turn freely in all directions without falling under its own weight.

When the refitting has been carried out, stake the edges of the ball joint seat as shown by the arrow.



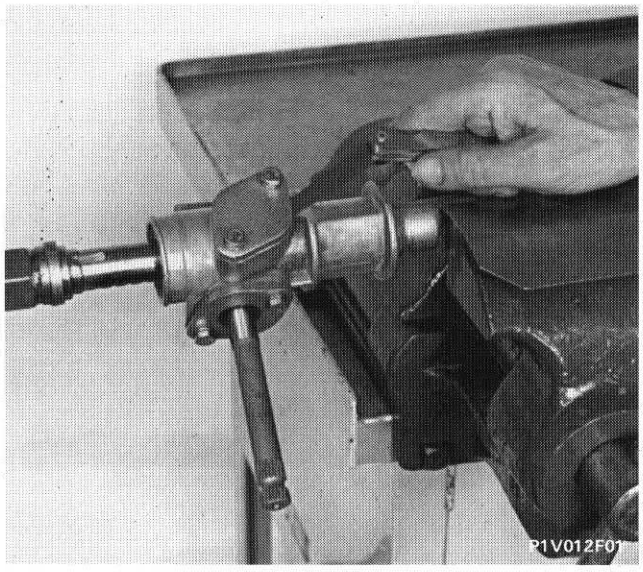
Removing-refitting rack support bush in steering box

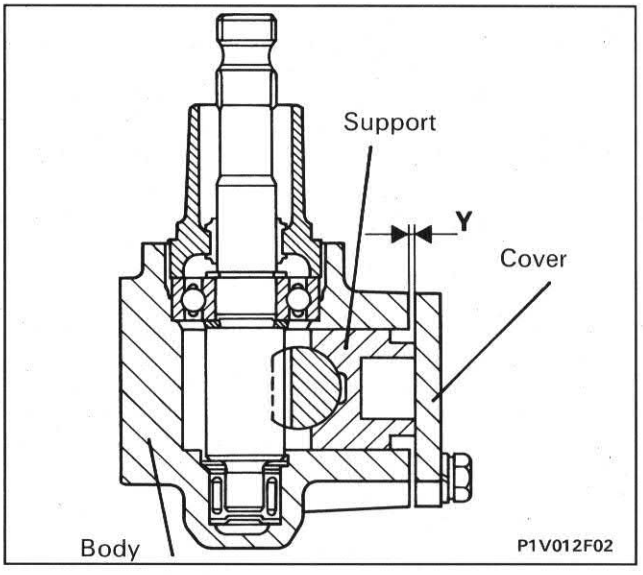
Steering box components available as spares



1. Rack support flexible bush
2. Rack
3. Worm screw
4. Ball joint
5. Support cover
6. Spring
7. Adjustment shims (available as spares in the following sizes: 0.25-0.30-0.35-0.45 mm)
8. Seal
9. Support
10. Steering box
11. Protective boot and seal

41.





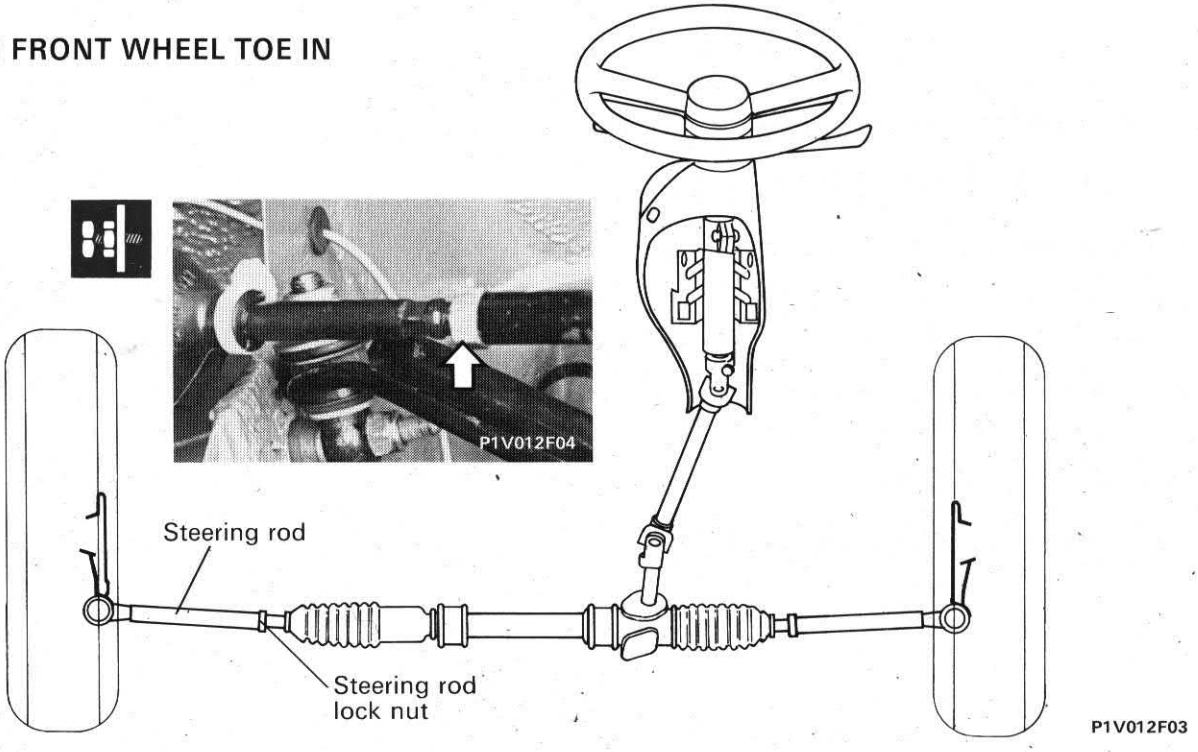
Fitting and adjusting rack support

NOTE *The determining of the thickness of the shims should be carried out without the spring and seal fitted.*

The adjustment is carried out using shims placed between the steering box casing and the support cover. The value of the shims to be used is obtained by adding 0.05 - 0.13 mm, corresponding to the clearance between the support and the cover to distance Y. The adjustment shims are available in the following sizes 0.25 - 0.30 - 0.35 0.45 mm.

NOTE *When the steering box has been fitted, the torque required to start the rotation of the pinion should be between 1.3 and 2.1 Nm (13.25 and 21.5 kgcm).*

ADJUSTING FRONT WHEEL TOE IN



The adjustment of the front wheel toe in is carried out by loosening the rod lock nut and tightening or loosening the steering rod until the correct toe in is obtained without altering the position of the steering wheel spokes.

1847044000 Tool for removing steering rod ball joints

1874247000 Tool for fitting rack rod bush

1895697000 Dynamometer (0-4.90 Nm) for measuring steering box bearings rolling torque

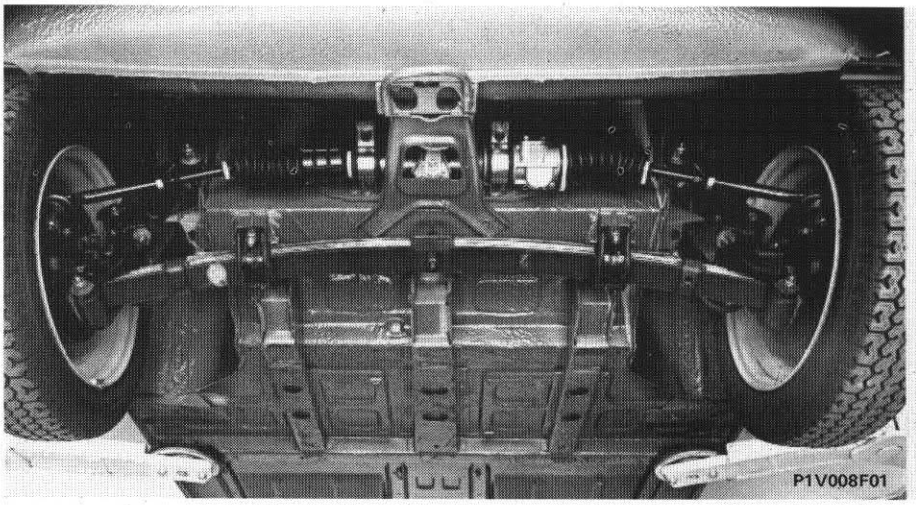
1895697009 Tool for checking steering box bearings rolling torque (to be used with 1895697000)

Tightening torques

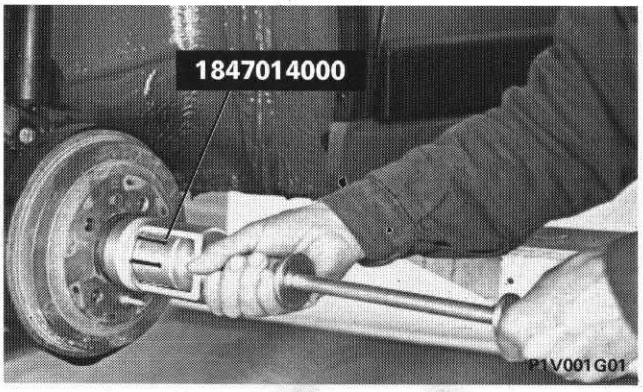
DESCRIPTION	Thread size	Tightening torque
		daNm
Steering wheel to steering shaft fixing, nut	M 16 x 1,5	4,9
Universal joint fork to steering shaft fixing, nut	M 8	2,6
Upper steering shaft rear mounting fixing, nut	M 8	1,5
Upper steering shaft mounting fixing, nut	M 8	1,5
Ball joint to steering control levers fixing, nut	M 10 x 1,25	3,4
Steering box fixing, bolt	M 8	2,5
Ball joint to side steering rod fixing, nut	M 14 x 1	4,9

REMOVING-REFITTING

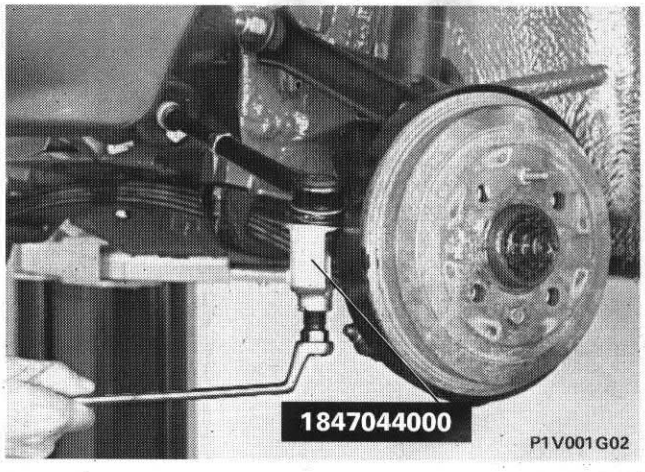
In order to remove and refit the front suspension from the vehicle, after positioning the vehicle on a lift and removing the front wheels, proceed as illustrated below.



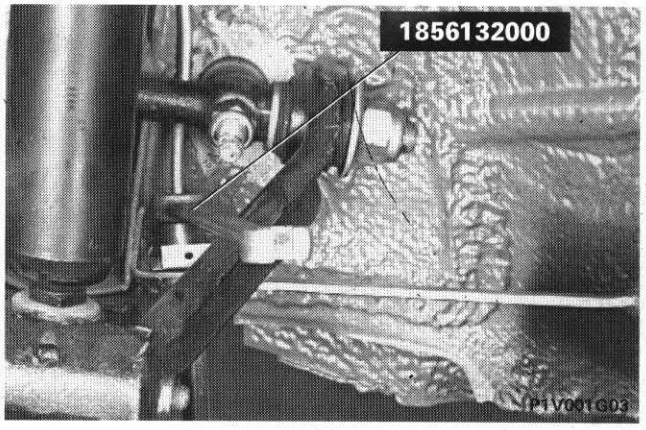
Front suspension assembly on vehicle



Removing front wheel hub cap

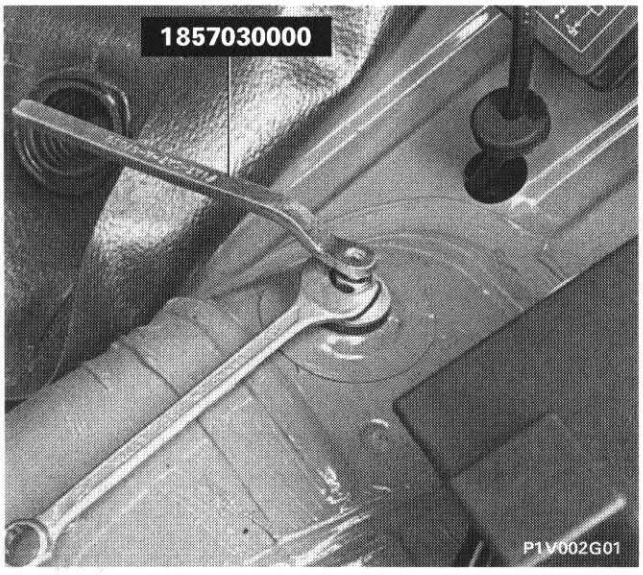


Removing side steering rod from lever on steering knuckle

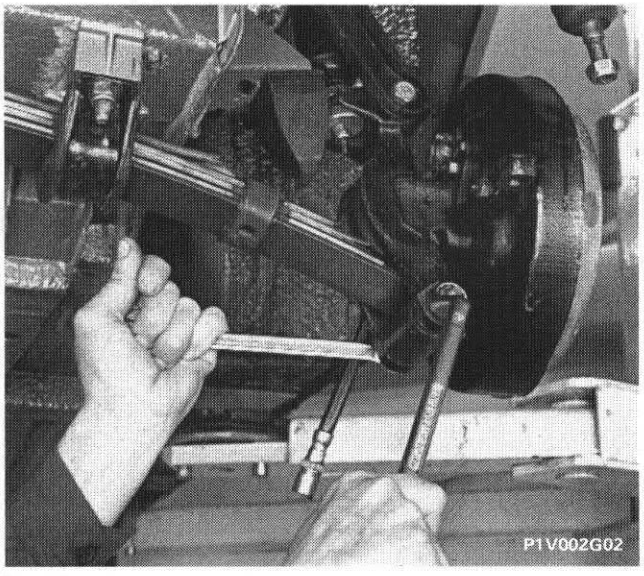


Removing flexible brake pipe from union, on the bodyshell

44.

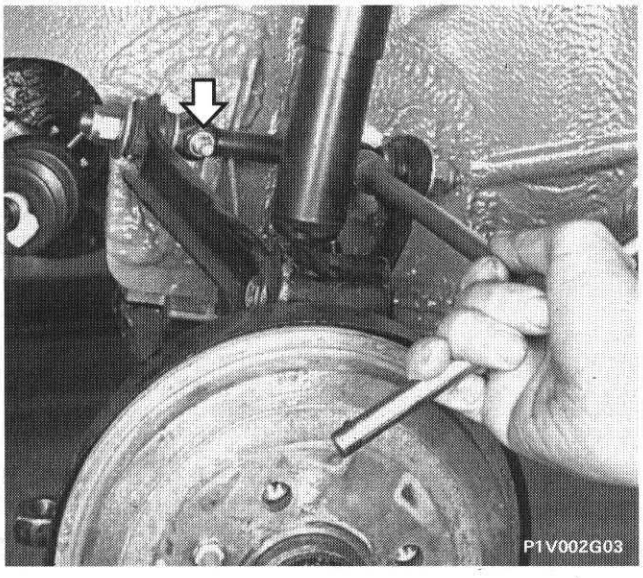


Removing nut fixing shock absorber to bodyshell



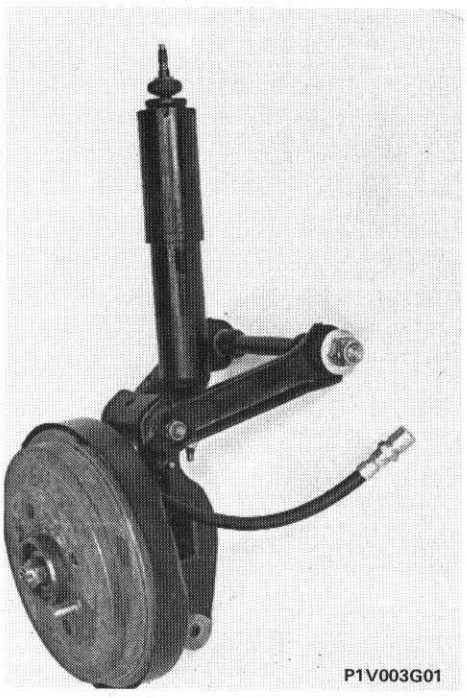
Removing leaf spring from steering knuckle damper

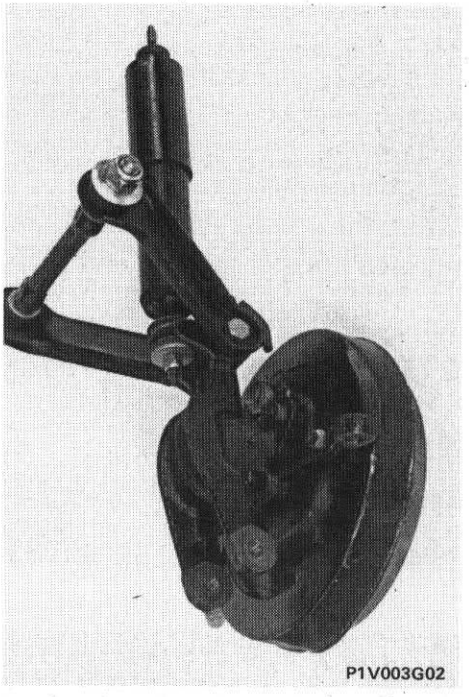
In order to remove the fixing bolt, the end of the leaf spring (near the flexible bush) has to be compressed using a hydraulic jack.



Removing track control arm pin from the bodyshell

Whilst removing the front suspension make a note of the number of shims (shown by the arrow) between the bodyshell and the track control arm pin in order to avoid altering the wheel angles (camber and caster) when refitting.

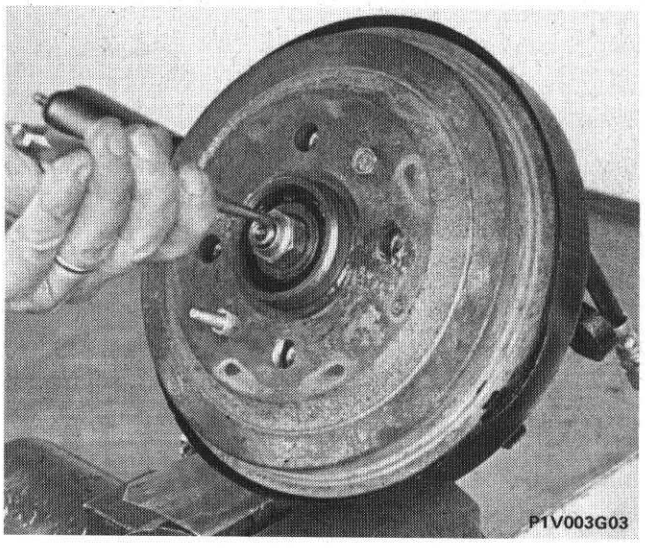

P1V003G01


P1V003G02

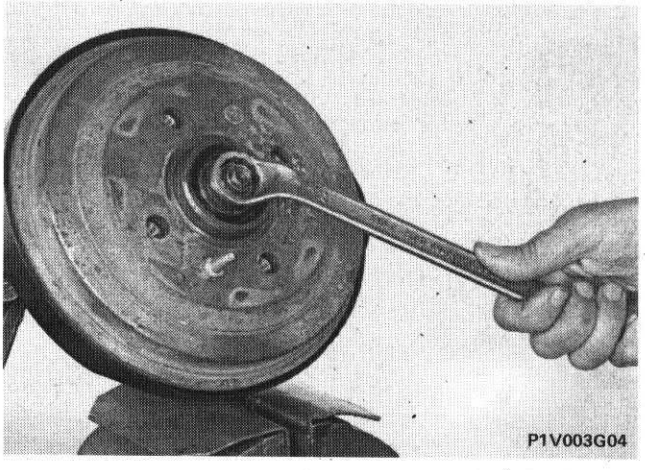
Front suspension assembly removed from the vehicle

In order to remove the complete suspension, carry out the same operations as described previously, only this time on the other side.

DISMANTLING-REASSEMBLING

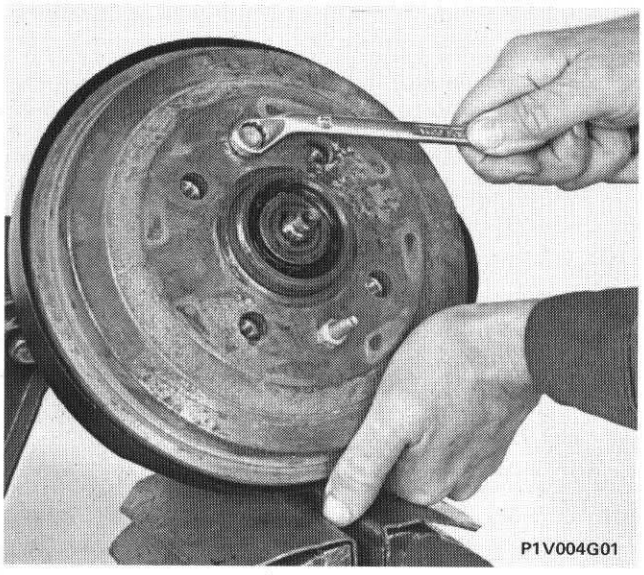

P1V003G03

Removing staking on nut retaining front wheel hub

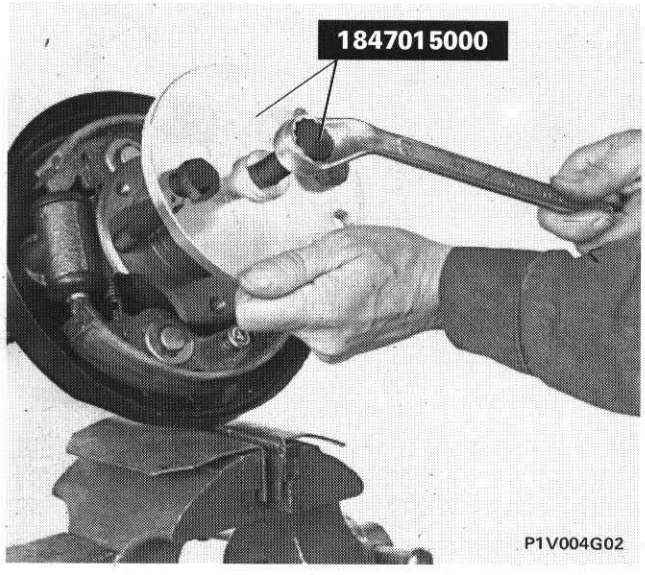

P1V003G04

Removing front wheel hub retaining nut

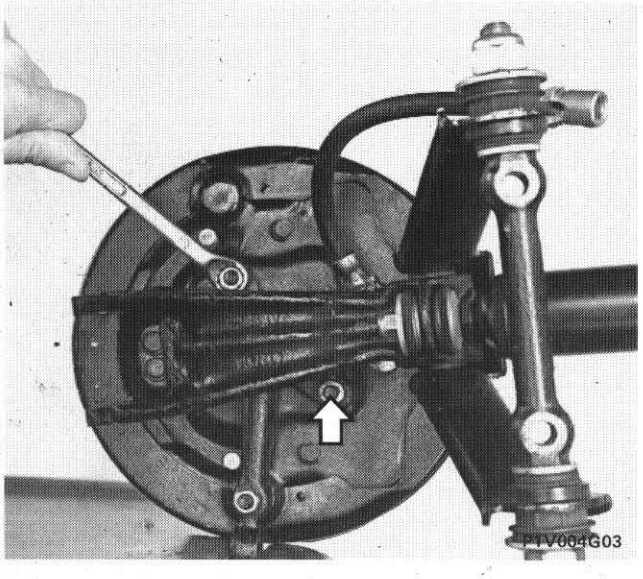
44.



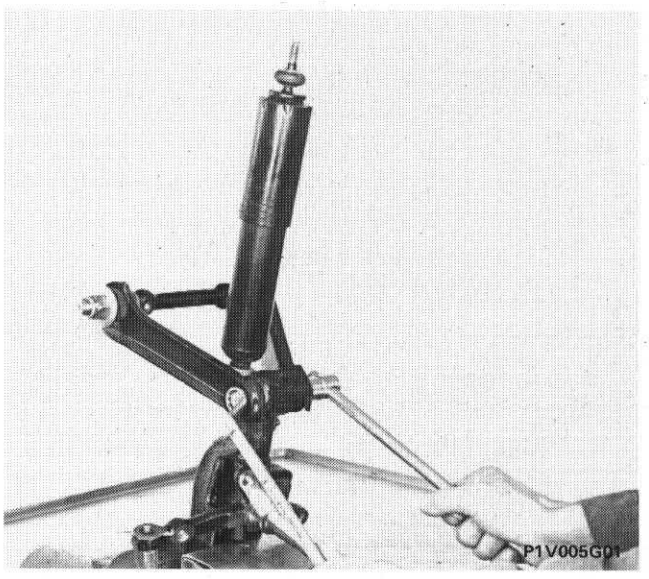
Removing brake drum



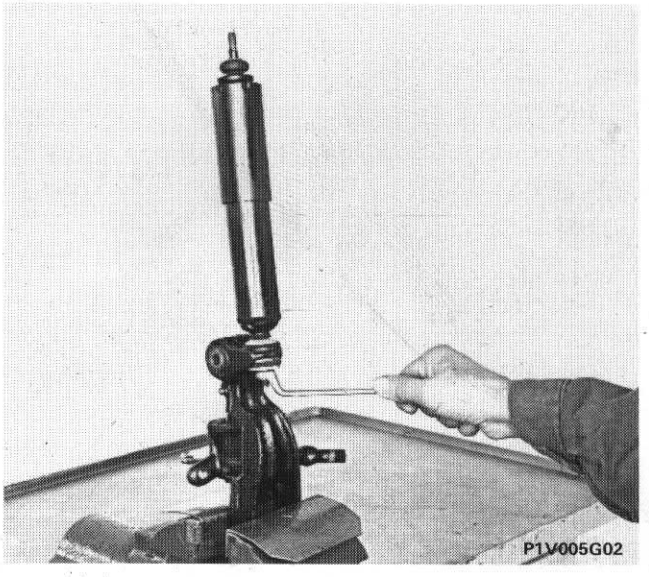
Removing wheel hub from steering knuckle



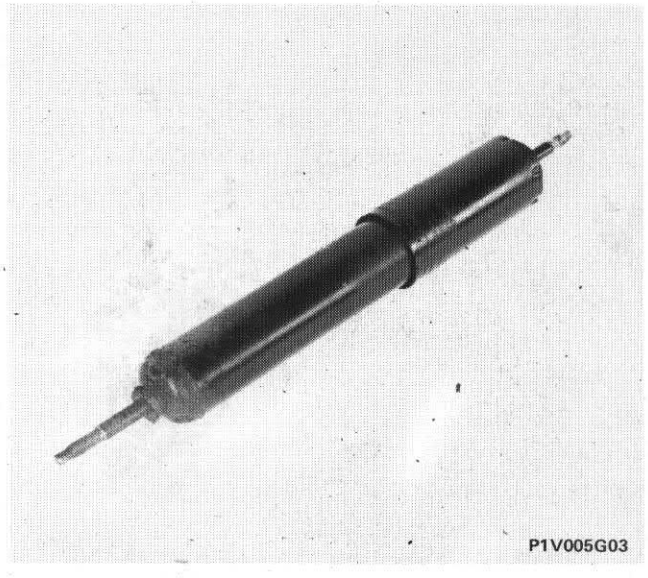
Removing brake back plate assembly from steering knuckle



Removing track control arm from steering knuckle damper



Removing shock absorber from steering knuckle damper

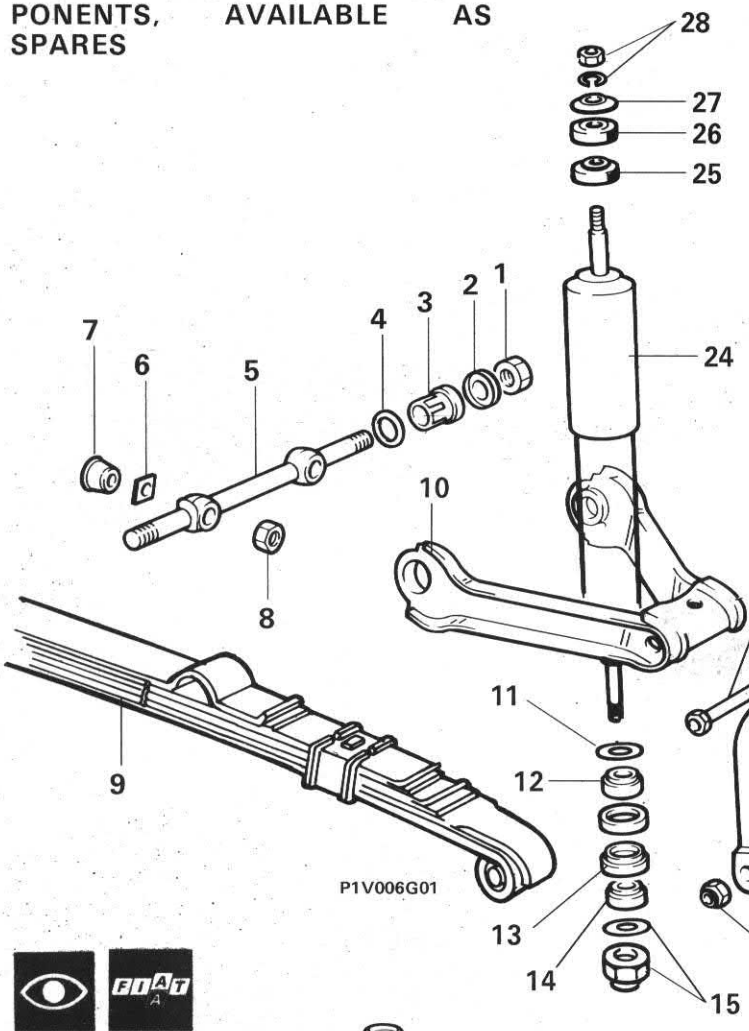


Shock absorber check

If any anomalies which are attributable to the shock absorber are found, it must be replaced in one piece.

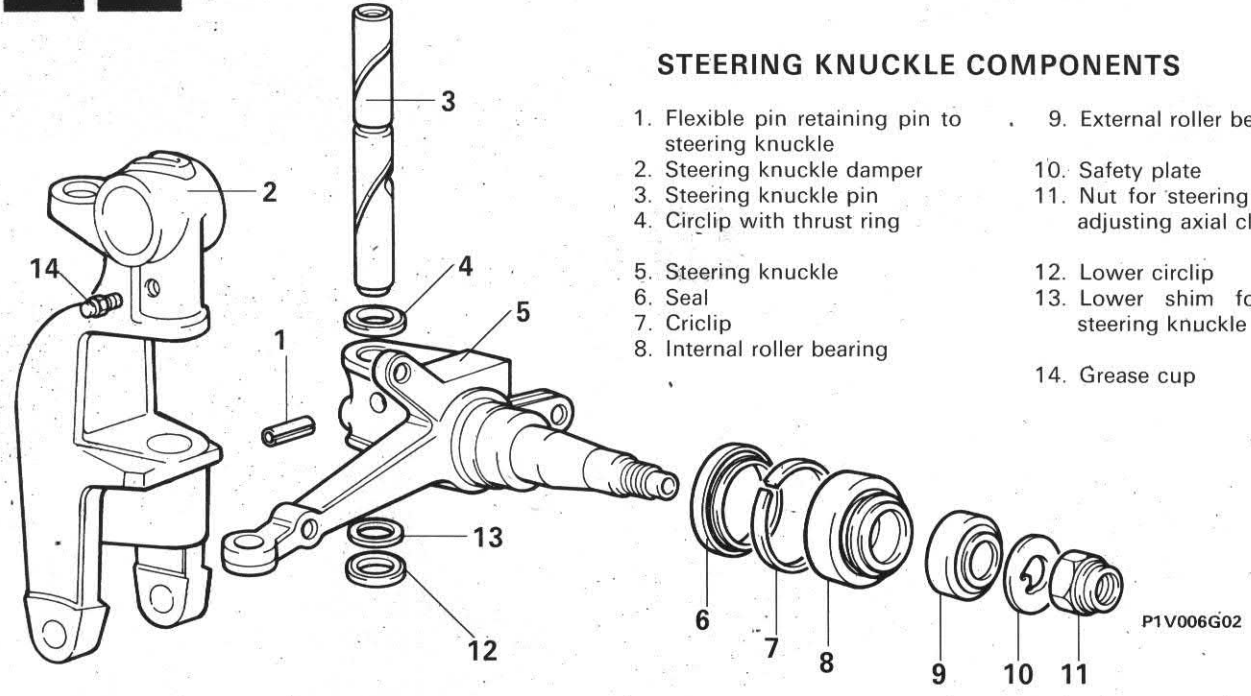
44.

FRONT SUSPENSION COMPONENTS, AVAILABLE AS SPARES



1. Nut fixing pin to track control arm
2. Cap
3. Flexible bush
4. Spacer
5. Pin for track control arm
6. Plate for adjusting camber and caster
7. Spacer
8. Nut fixing track control arm pin to bodyshell
9. Leaf spring
10. Track control arm
11. Wahser
12. Upper flexible bush
13. Lower cap
14. Lower flexible bush
15. Nut with washer fixing shock absorber to damper
16. Nut for bolt fixing leaf spring to damper
17. Damper for steering knuckle pin
18. Plug
19. Bushes for steering knuckle pin
20. Bolt fixing leaf spring to damper
21. Nut for bolt fixing track control arm to damper
22. Damper flexible bush
23. Bolt fixing track control arm to damper
24. Hydraulic shock absorber
25. Lower flexible bush
26. Upper flexible bush
27. Upper cap
28. Nut with washer fixing upper hydraulic shock absorber to bodyshell

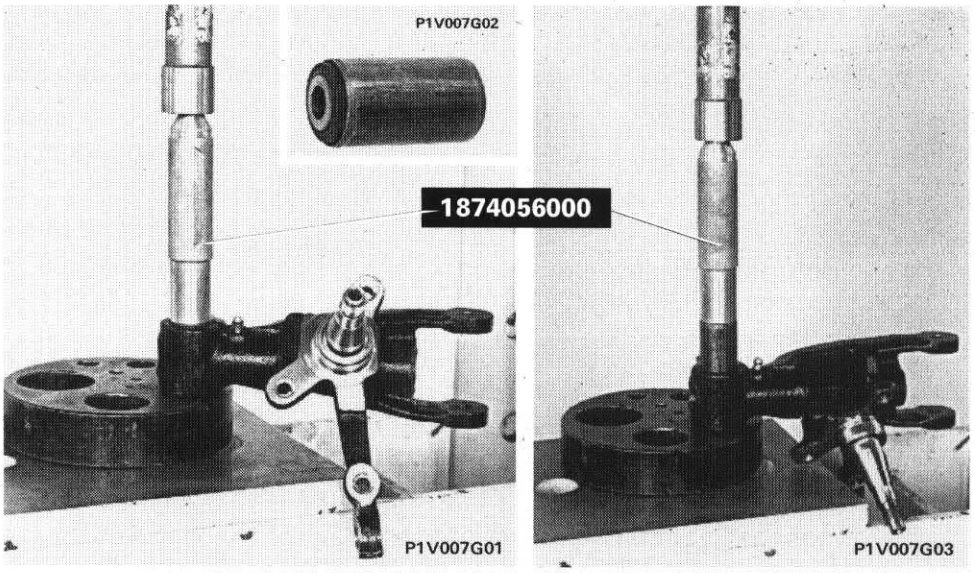
STEERING KNUCKLE COMPONENTS



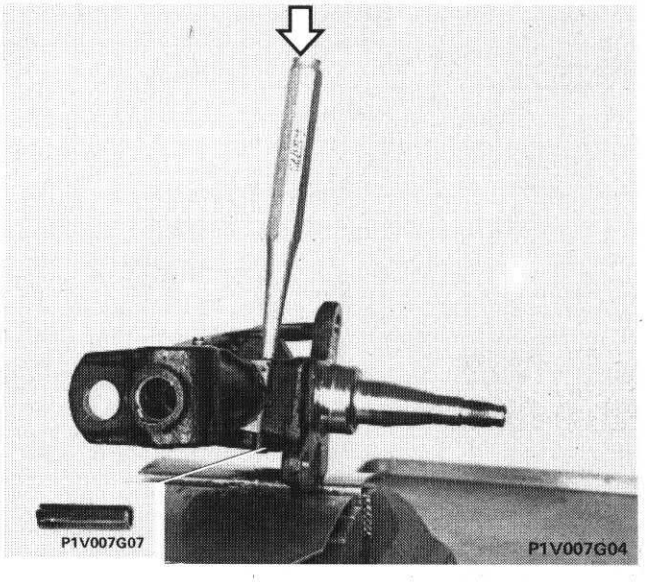
1. Flexible pin retaining pin to steering knuckle
2. Steering knuckle damper
3. Steering knuckle pin
4. Circlip with thrust ring
5. Steering knuckle
6. Seal
7. Criclip
8. Internal roller bearing
9. External roller bearing
10. Safety plate
11. Nut for steering knuckle for adjusting axial clearance
12. Lower circlip
13. Lower shim for adjusting steering knuckle end float
14. Grease cup

The lower shims are available as spares in the following sizes: 2.50 - 2.52 - 2.54 - 2.56 - 2.58 - 2.60 - 2.62 - 2.64 -2.66 - 2.68 - 2.70 - 2.72 - 2.74 - 2.76 - 2.78 - 2.80 - 2.82 mm.

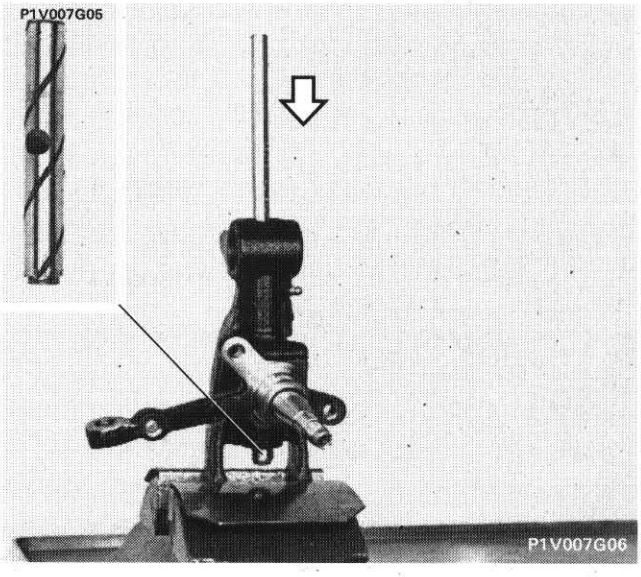
STEERING KNUCKLE



Removing - refitting steering knuckle damper flexible bush on the press

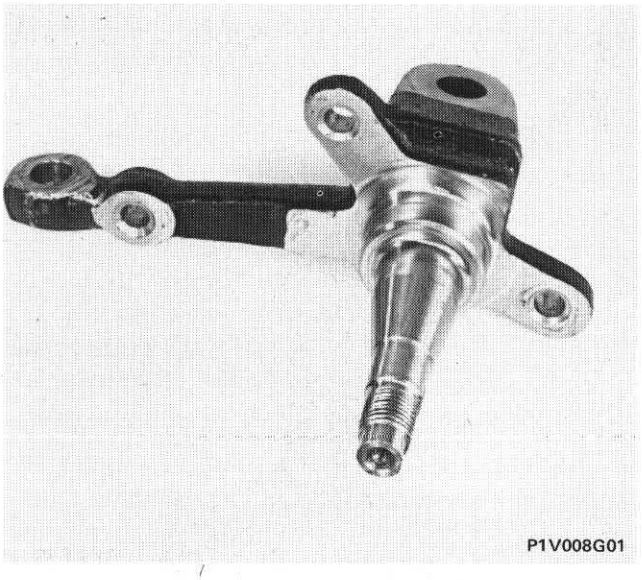


Removing flexible pin retaining pin to steering knuckle



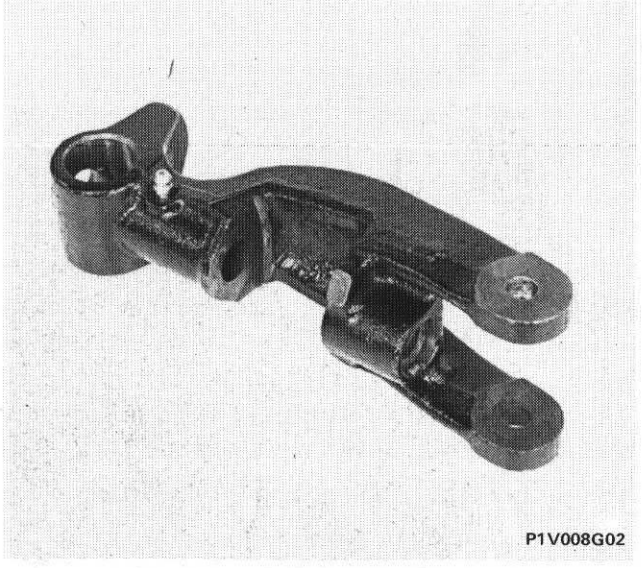
Removing steering knuckel pin from damper

44.



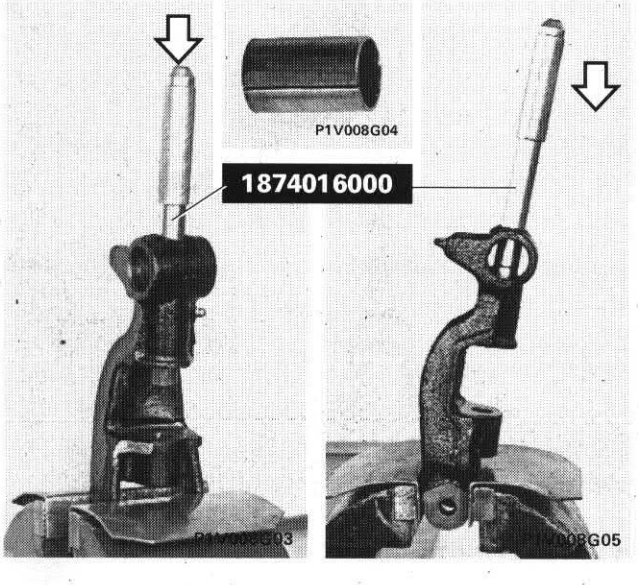
The steering knuckle should not show any signs of cracks, distortion or wear or else it must be replaced.

Examine the condition of the two circlips, upper and lower and the lower thrust washer; they should not be worn; if necessary, replace them. When refitting, there should not be a large clearance between the steering knuckle and the damper once the two circlips, upper and lower and the lower thrust washer have been fitted.
If this is not the case, fit the appropriate size lower thrust washer until the situation has been rectified.

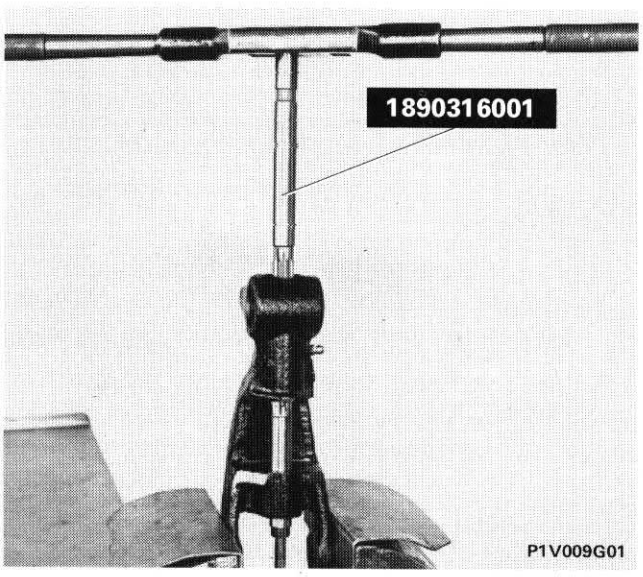


STEERING KNUCKLE DAMPER

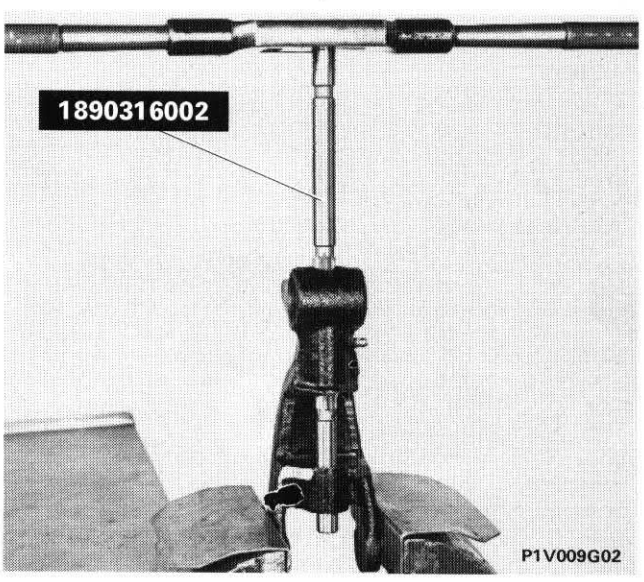
The steering knuckle damper should not show signs of distortion, cracks or wear or else it has to be replaced.



Removing-refitting bushes on steering knuckle damper.

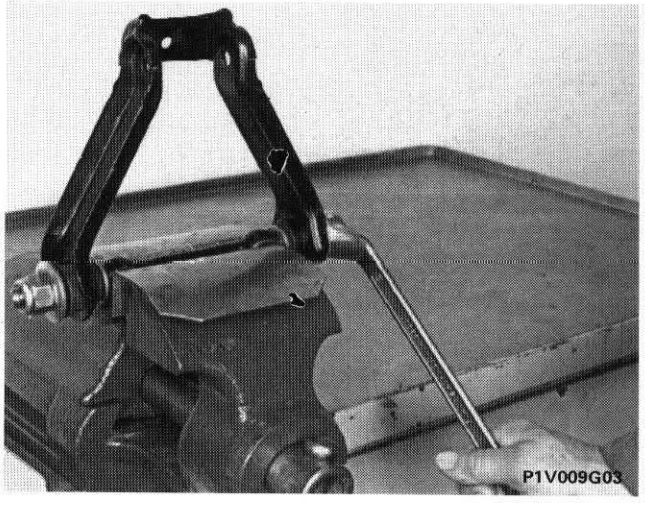


Reaming steering knuckle bushes on damper (to roughen)

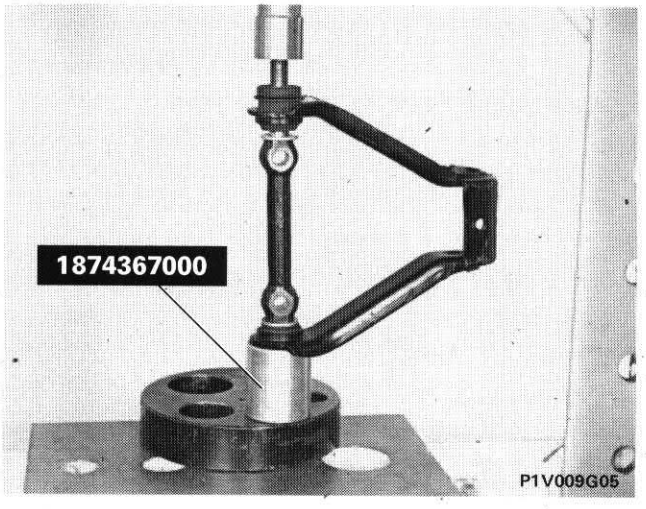


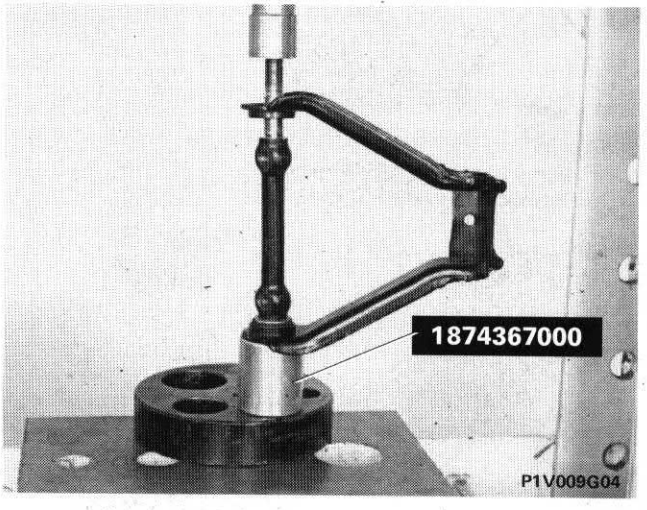
Reaming steering knuckle bushes on damper (to finish)

TRACK CONTROL ARMS



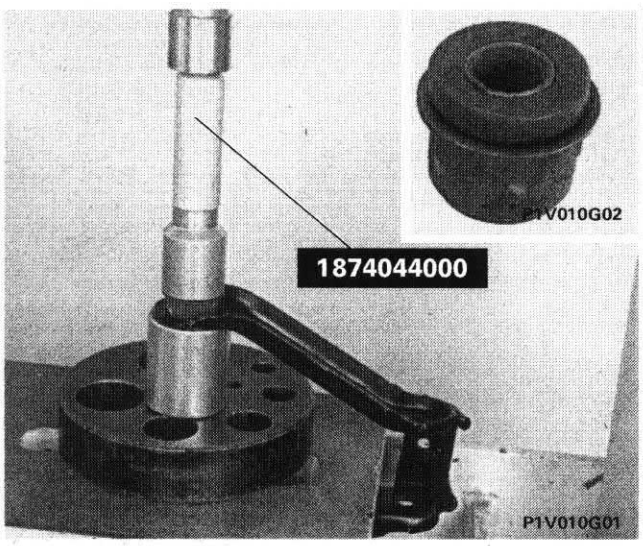
Removing - refitting nuts fixing pin to track control arm

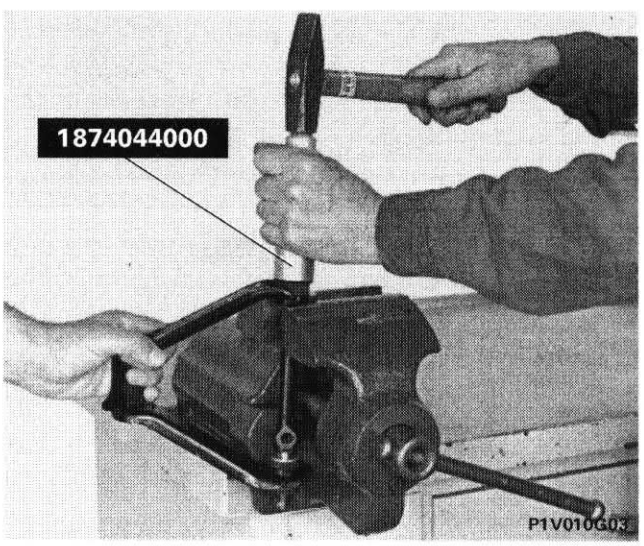




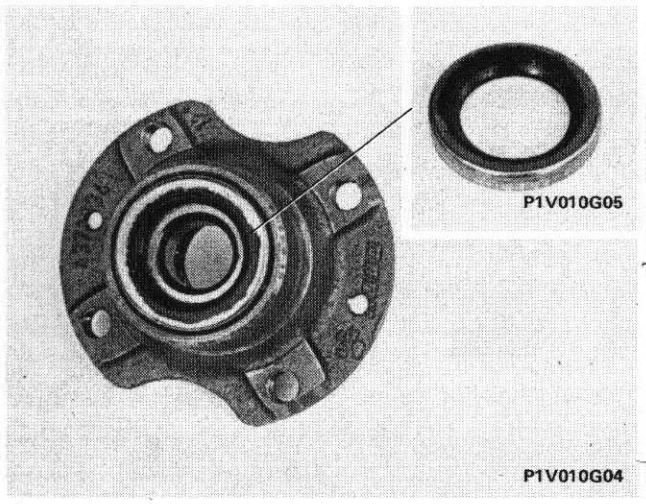
Removing flexible bushes from track control arm

44.





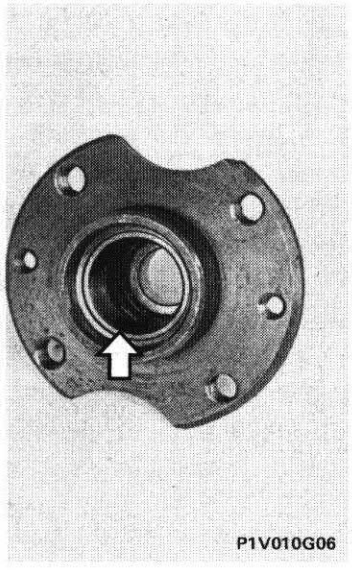
Fitting flexible bushes and pin for track control arm



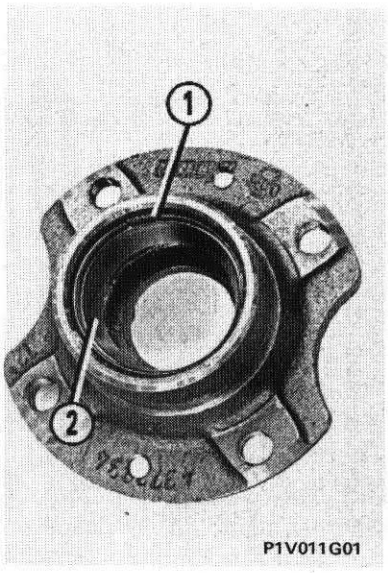
WHEEL HUB

Removing - refitting wheel hub seal

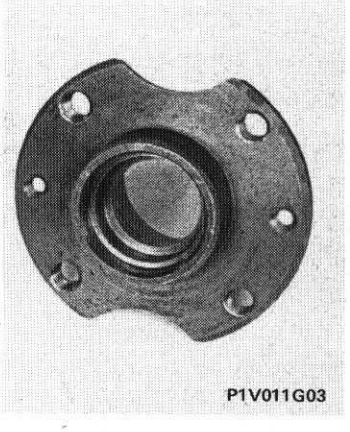
The operations of removing and refitting the seal are carried out using ordinary methods.

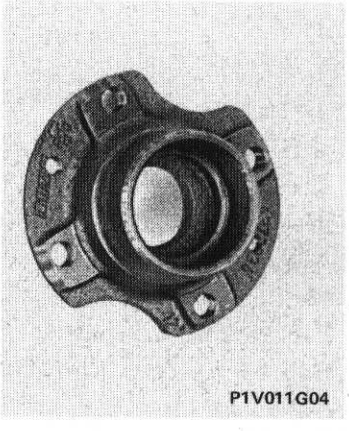


Removing external roller bearing outer race (shown by arrow) from wheel hub

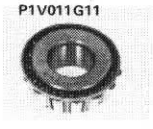


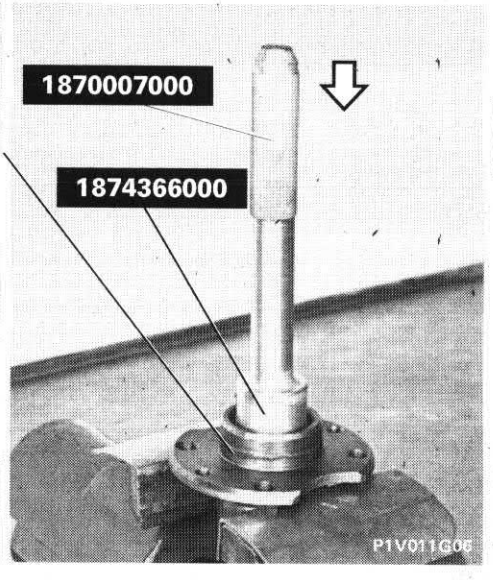
Removing circlip (1) and outer ring (2) for internal conical roller bearing from wheel hub



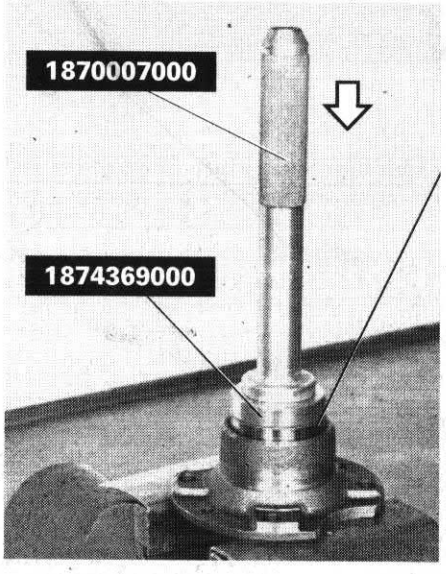


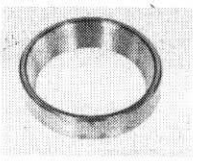
Check that there are no grooves or signs of wear on the wheel hub bearing seats or else the hub has to be replaced.

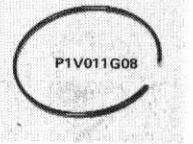


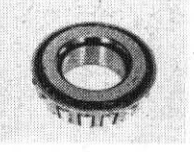


Fitting outer race for external conical roller bearing on wheel hub



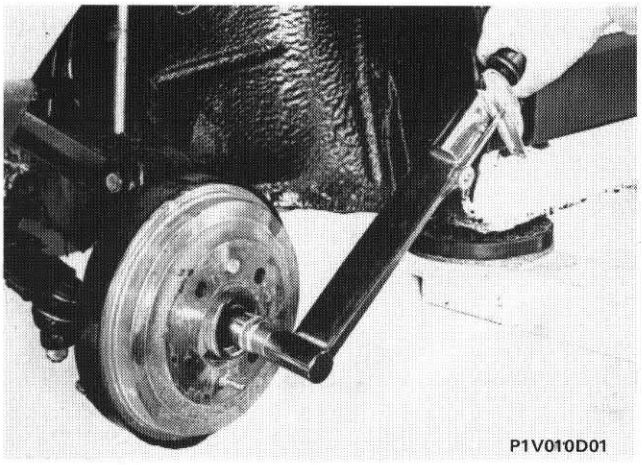






Fitting outer race for internal conical roller bearing on wheel hub

44.



0,7 daNm

NOTE *In order to refit the front suspension, simply reverse the order of the operations carried out for its removal.*

FRONT WHEEL HUB ADJUSTMENT

In order to adjust the front wheel hub roller bearings end float, the bearing fixing nut must be tightened to a torque of 0.7 daNm and then loosened through 30° (as illustrated in the diagram below).
Under these circumstances the end float should be 0.025 - 0.100 mm.

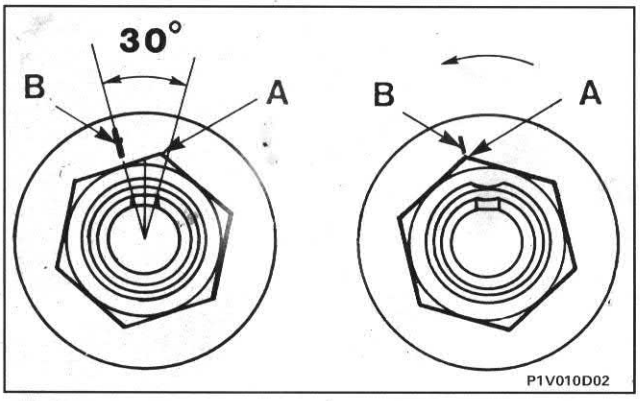
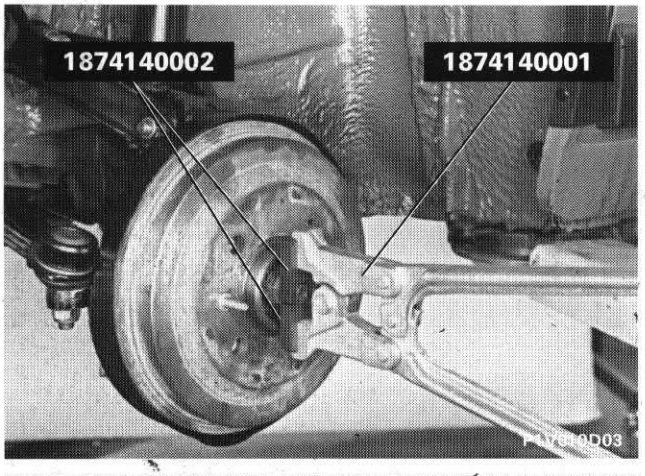
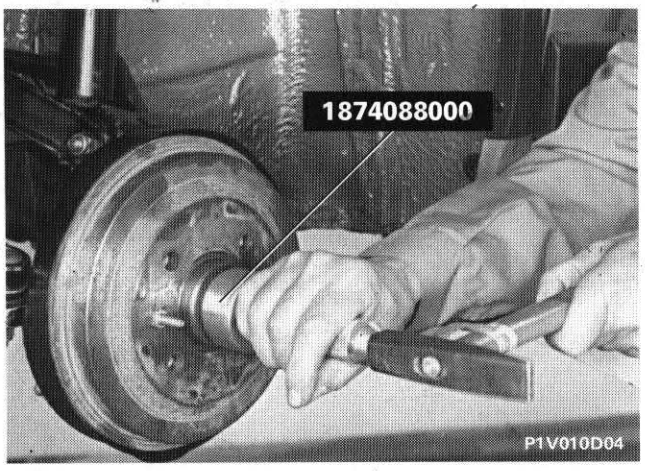


Diagram showing front wheel hub roller bearing end float adjustment

A. Corner of nut after tightening to a torque of 0.7 daNm.
B. Reference mark on wah ser for loosening nut by 30°.



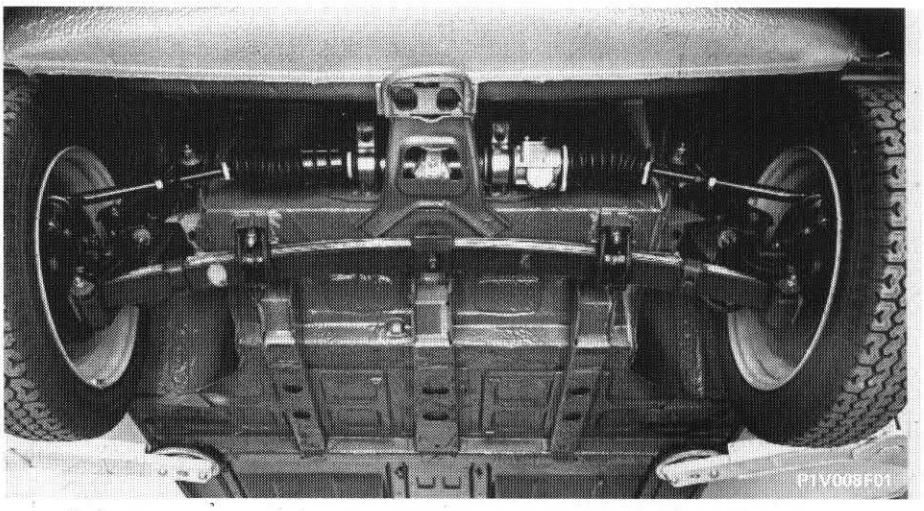
Staking nut fixing front wheel hub



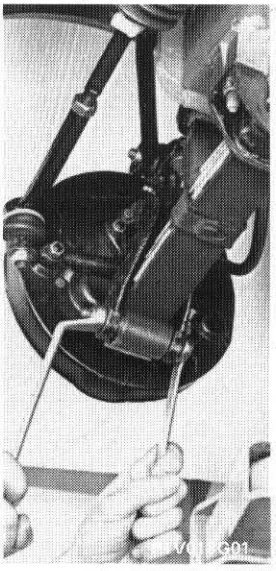
Fitting front wheel hub cover

NOTE *Before fitting, smear TUTELA MR3 grease along the edges of the hub cap*

REMOVING-REFITTING LEAF SPRING

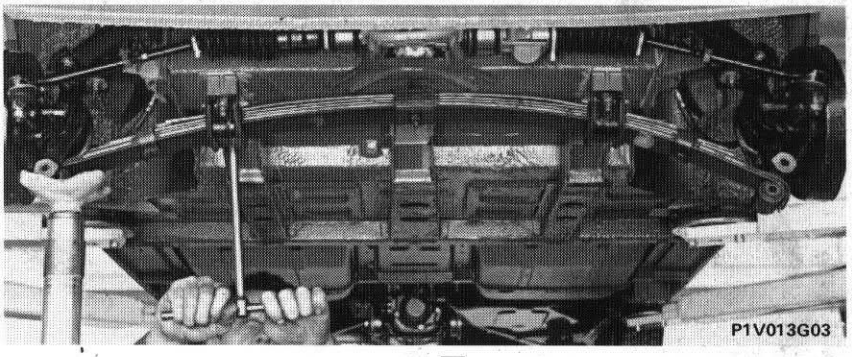


Front suspension assembly fitted on vehicle



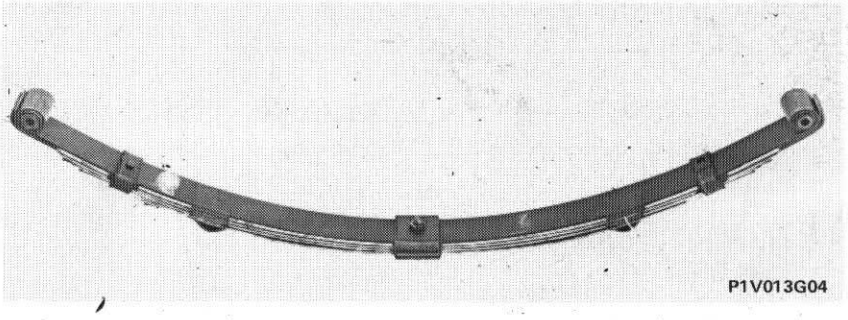
Removing - refitting bolt fixing leaf spring to steering knuckle pin damper

The end of the leaf spring (near the flexible bush) has to be compressed in order to be able to remove the fixing bolt.



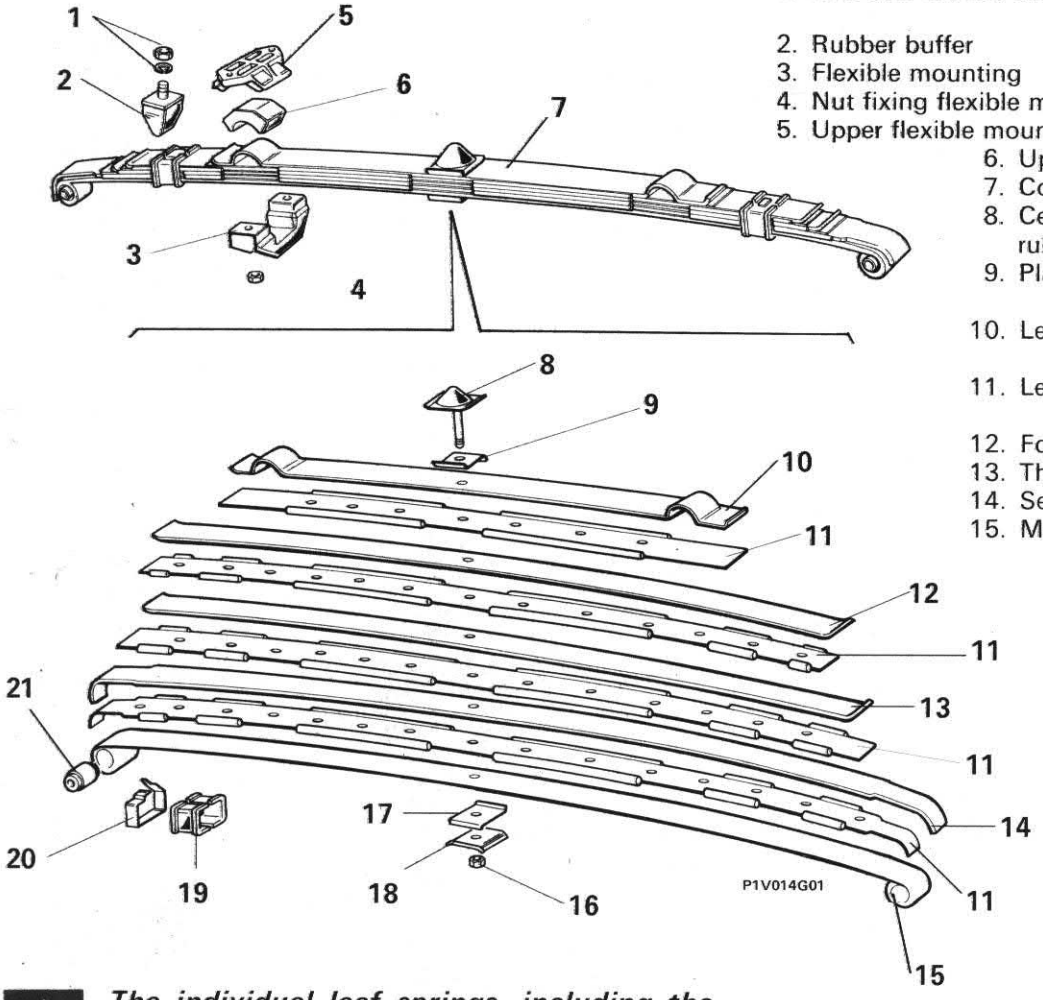
Remove the flexible mountings for fixing the leaf spring to the bodyshell

The leaf spring eyelet has to be supported by the hydraulic jack before removing the flexible mountings.



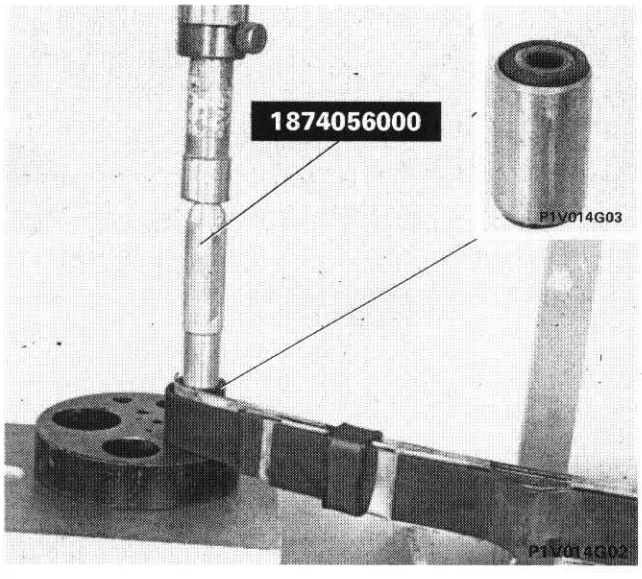
44.

LEAF SPRING COMPONENTS



1. Nut with washer fixing buffer to bodyshell
2. Rubber buffer
3. Flexible mounting
4. Nut fixing flexible mounting to bodyshell
5. Upper flexible mounting support
6. Upper flexible mounting
7. Complete leaf spring
8. Centre pin complete with rubber buffer
9. Plate for centre pin
10. Leaf spring upper leaf
11. Leaf spring leaf spacers
12. Fourth leaf
13. Third leaf
14. Second leaf
15. Main leaf
16. Nut for centre pin linking leaf spring leaves
17. Upper plate
18. Lower plate
19. Flexible mountings
20. Leaf spring side bracket
21. Leaf spring eyelet flexible bush

The individual leaf springs, including the main one, are available as spares, however, if necessary, replace the complete leaf spring.



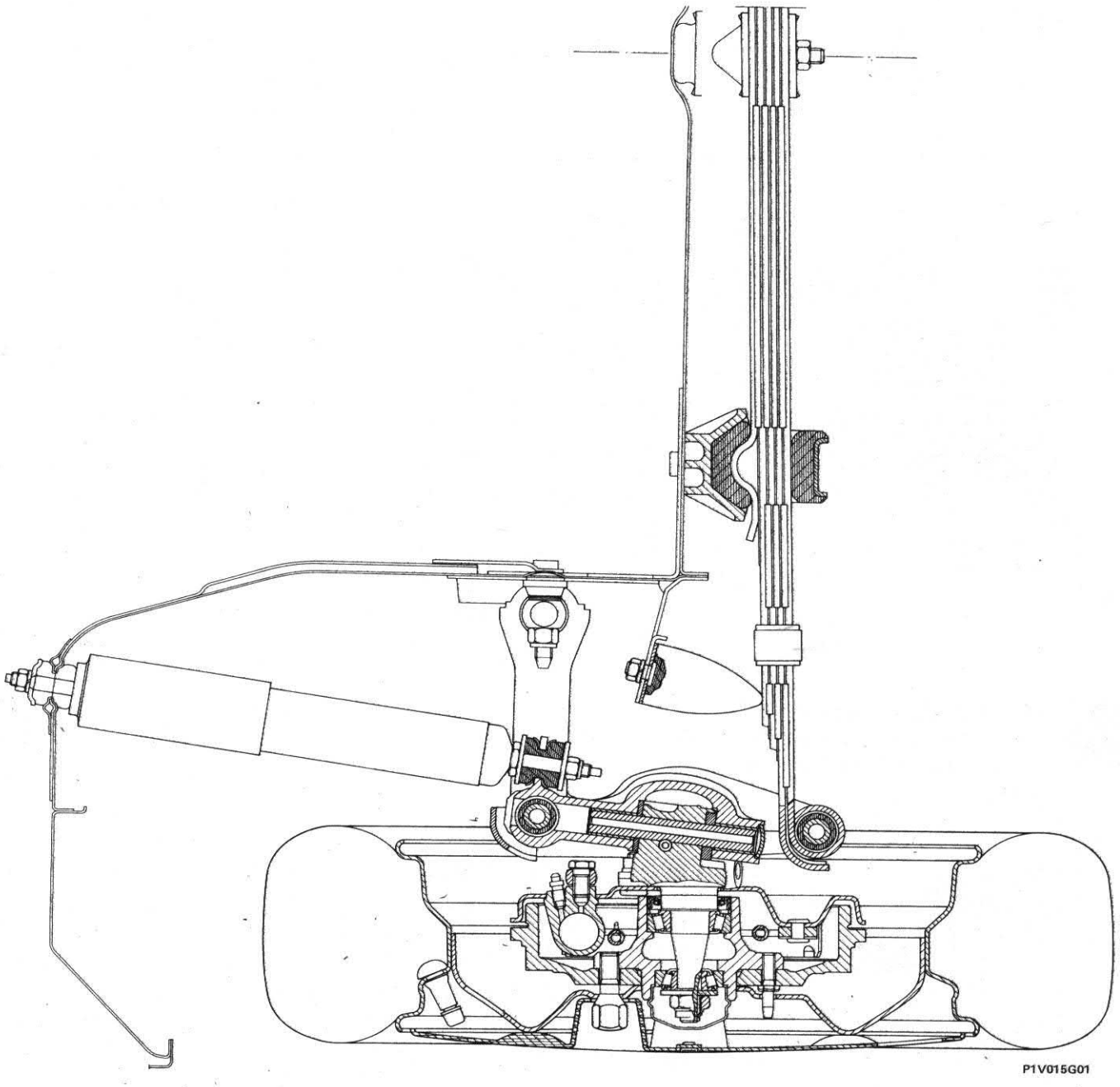
Checking leaf spring

Make sure that the leaf springs are not cracked, broken or distorted in such a way that would adversely affect their operation.

NOTE *The flexible bush should be replaced when traces of sliding or wear are noticed.*

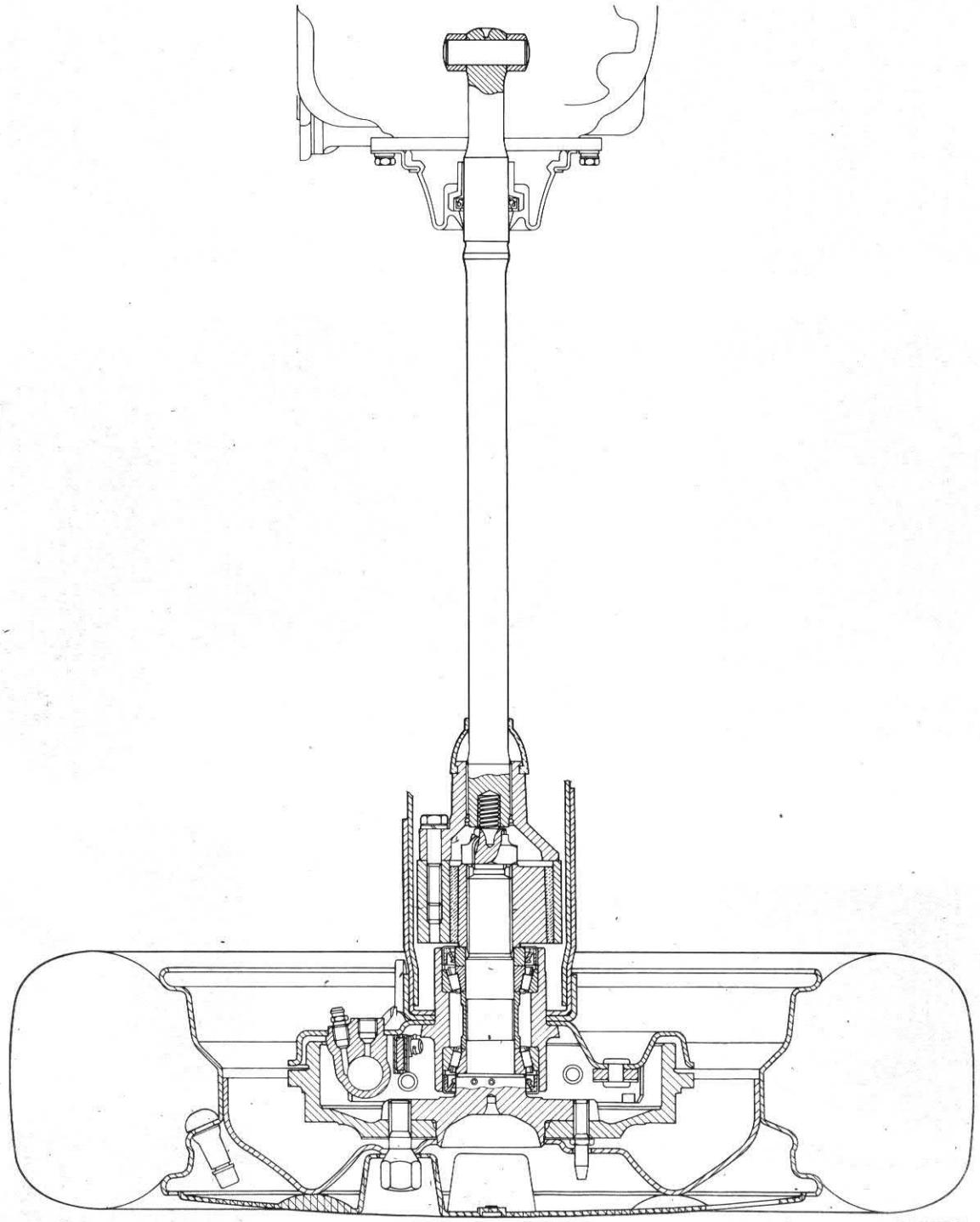
Removing - refitting flexible bush on leaf spring

CROSS SECTION OF FRONT SUSPENSION ASSEMBLY



44.

CROSS SECTION OF LEFT REAR WHEEL AND DIFFERENTIAL DRIVE SHAFT



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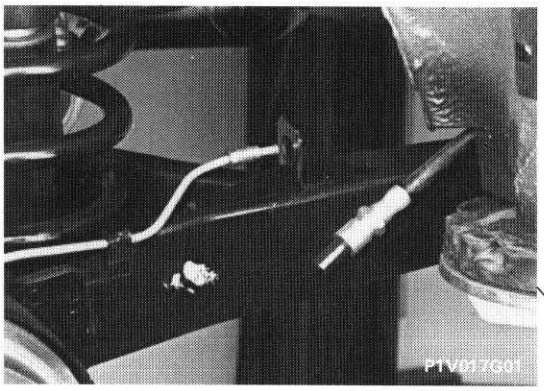
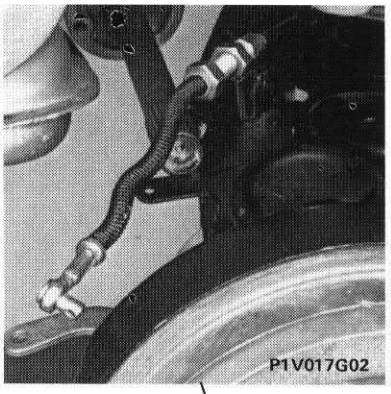
REMOVING-REFITTING

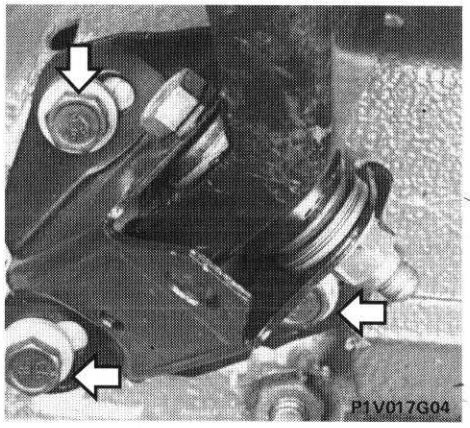
In order to remove and refit the rear suspension, position the vehicle on a lift, remove the rear wheels and then proceed as illustrated below:



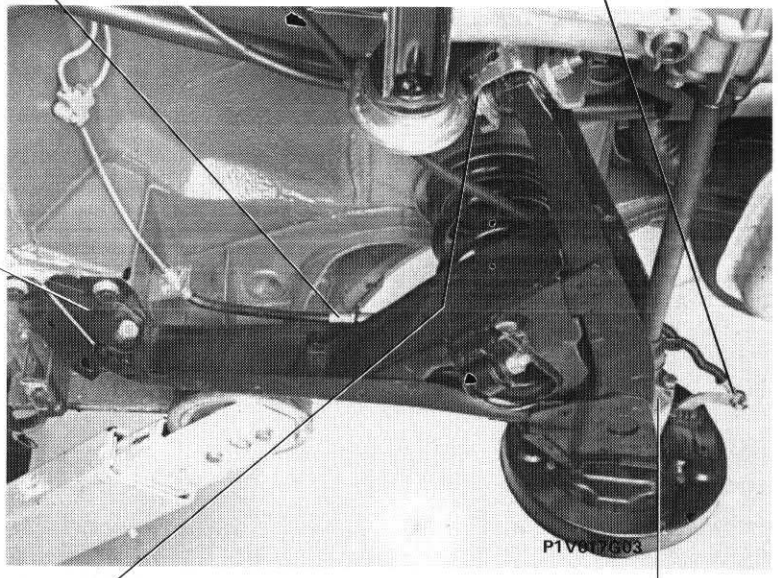
- disconnect the brake fluid pipe from the union;

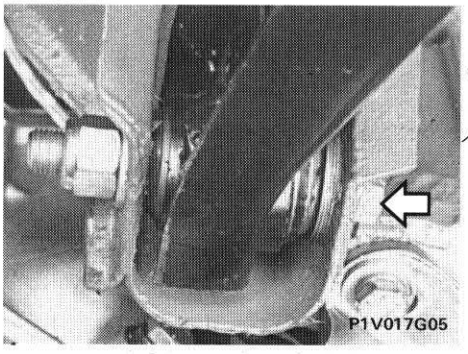


- disconnect the handbrake rod from the control lever;



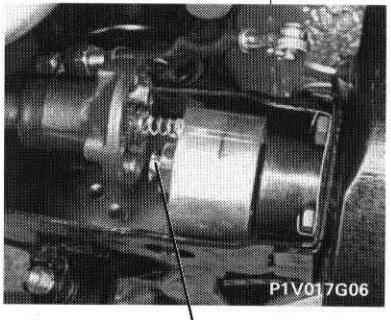
- removing bolts fixing track control front mounting to bodyshell;

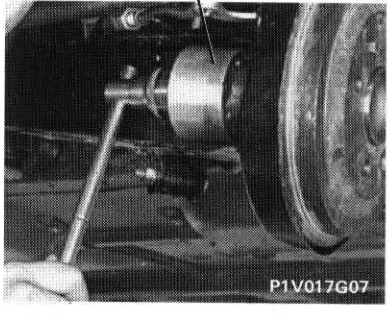




- removing rear bolt fixing track control arm to bodyshell. Make a not e of the number of shims at the sides of the flexible bush and of their position.

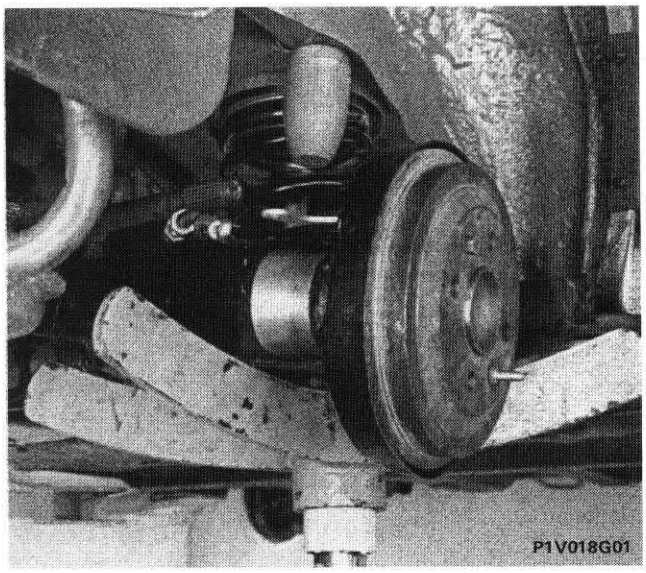
- removing bolts fixing drive shaft sleeve to flexible joint;



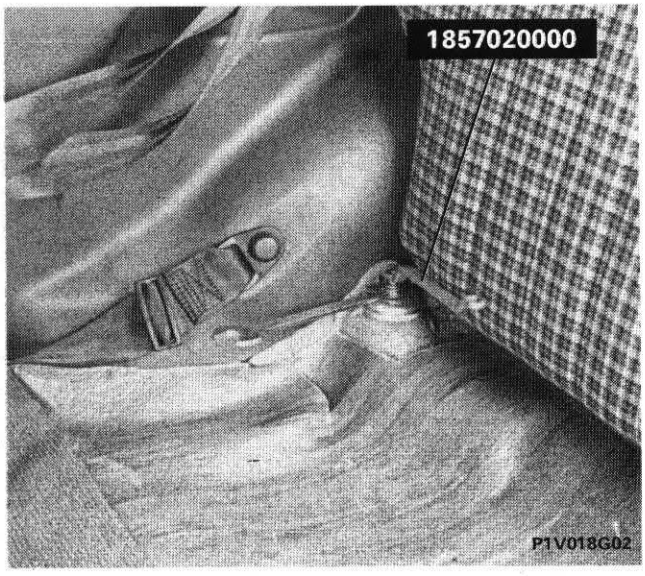


- removing nut fixing hub to track control arm;

44.

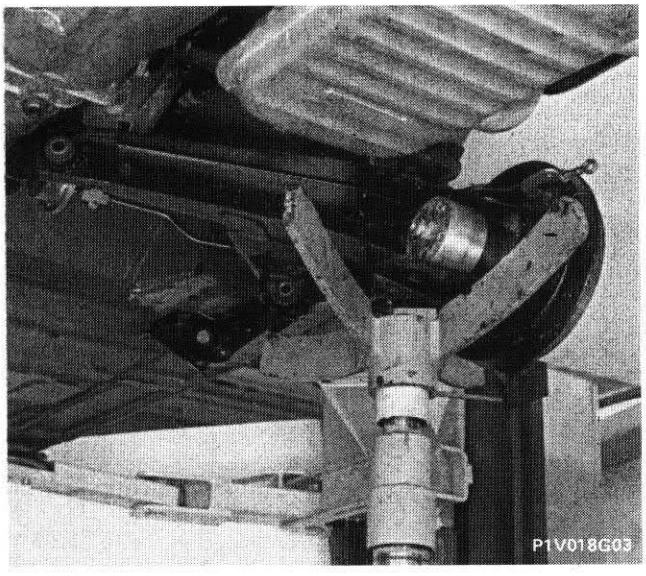


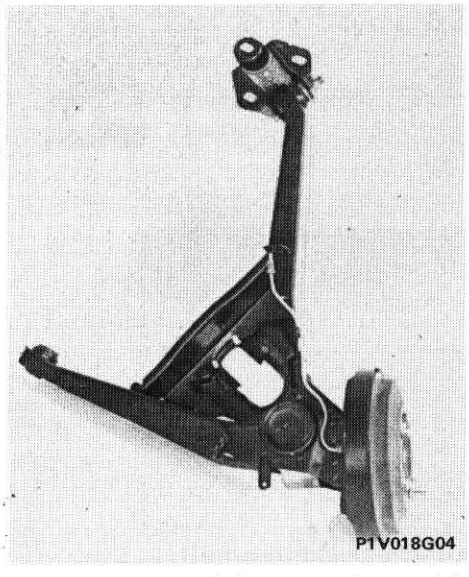
Using the hydraulic jack, compress the shock absorber and the coil spring to faciliate their removal.



Removing - refitting nut fixing shock absorber to bodyshell and removing - refitting shock absorber

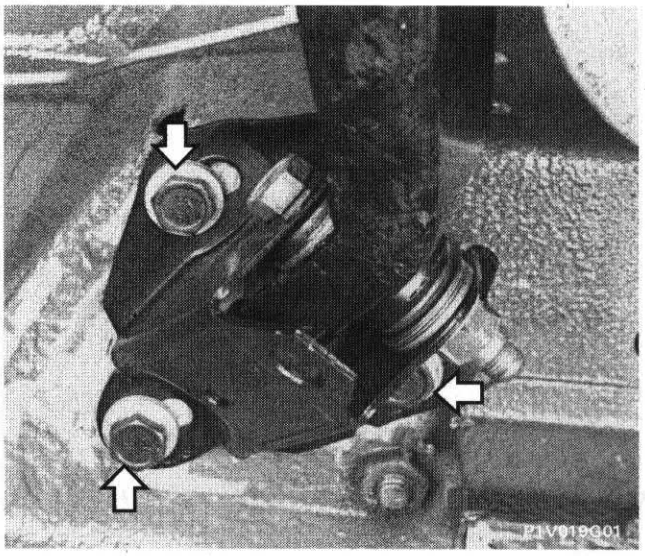
In order to reach the nut fixing the shock absorber to the bodyshell the rear seat has to be folded over and the rear parcel shelf cover raised.



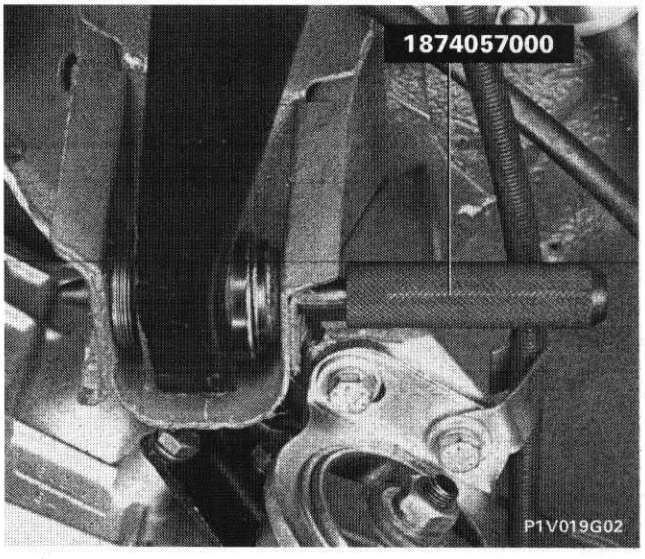


Lower the hydraulic jack and remove the right rear suspension assembly, complete with brake drum.

NOTE *In order to remove-refit the left rear suspension simply repeat the operations carried out for removing the right rear suspension.*
In order to refit the rear suspension simply reverse the order of the operations carried out for its removal, except for the two operations described below:



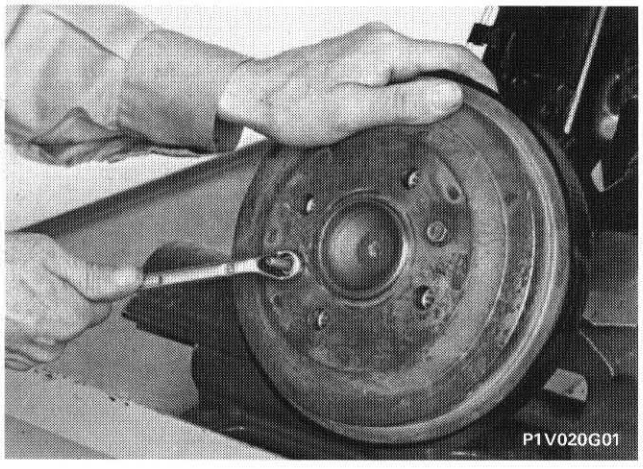
- tighten, but not fully, the bolts (shown by the arrows) fixing the mounting to the bodyshell; these bolts are tightened to a torque of 4.7 daNm only after the toe in has been adjusted;



- insert the inner end of the track control arm in the bodyshell mounting; refit the adjustment shims between the flexible bush and the mounting; using guide pin 1874057000, align the shims and the flexible bush; remove the tool, replacing it with the fixing bolt; tighten the nut to a torque of 7.8 daNm, after adjusting the toe in.

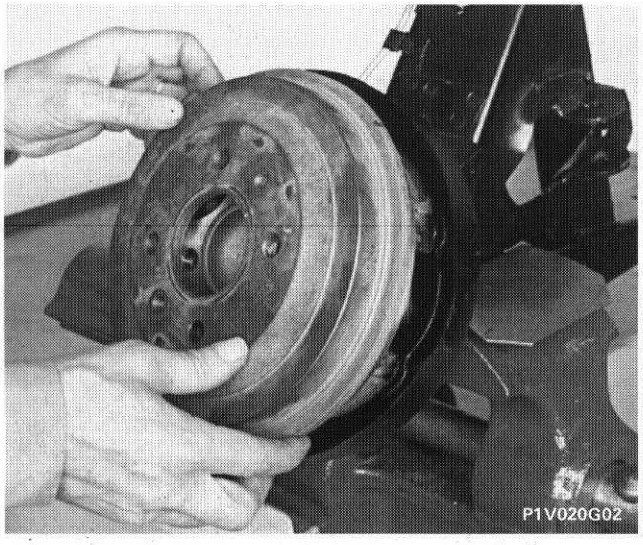
Centering flexible bush and shims on track control arm

44.

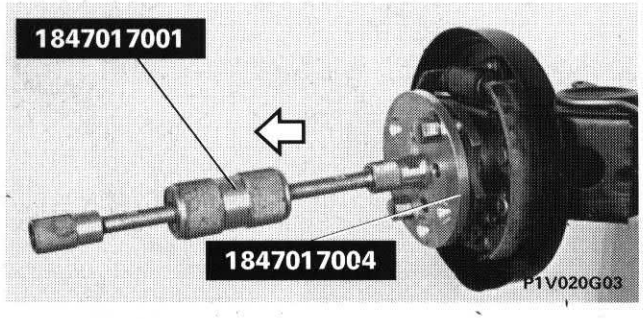


DISMANTLING-REASSEMBLING

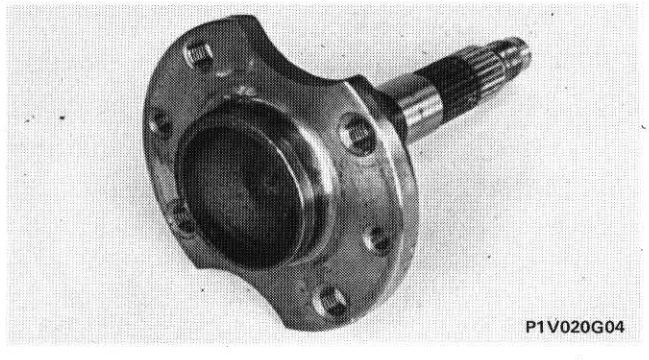
Removing stud and bolt fixing brake drum to hub



Removing brake drum

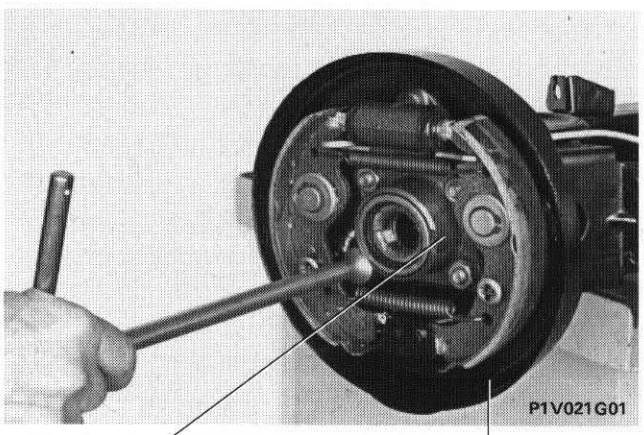


Removing wheel shaft

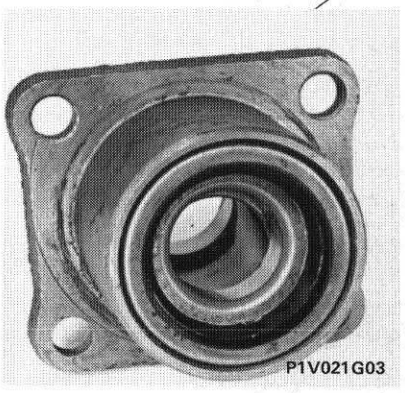


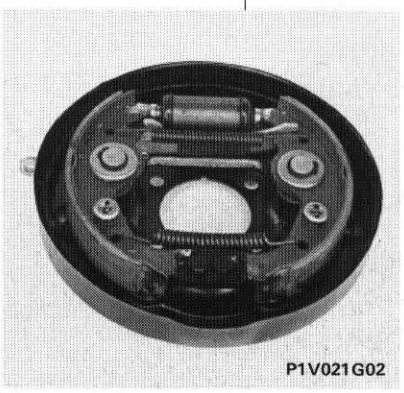
Wheel shaft

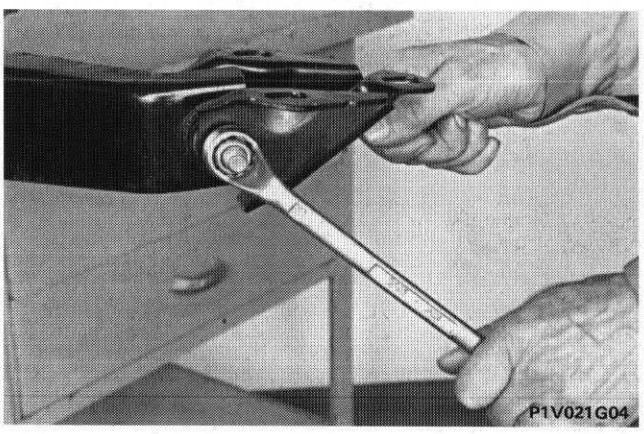
The wheel shaft should not show any signs of cracks, distortion or wear on the surfaces where the bushes are fitted or,else it has be replaced.



Removing brake back plate and wheel hub



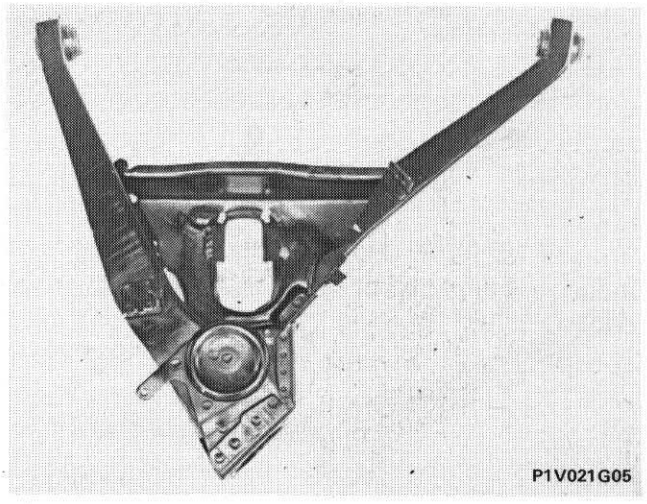




Removing track control arm mounting

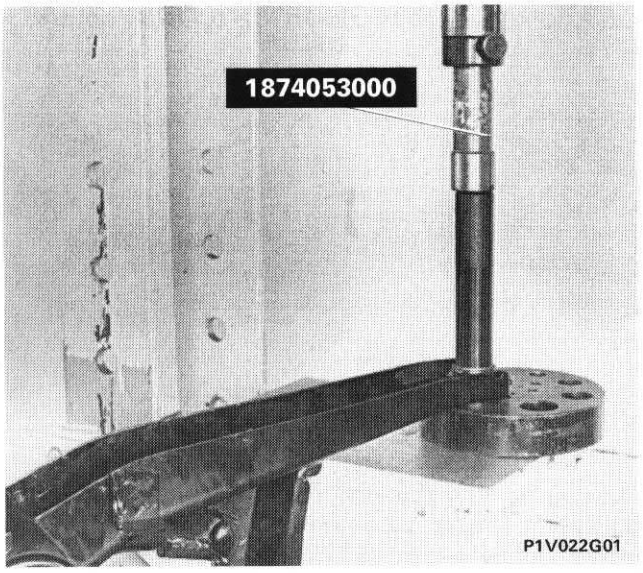
Check that the track control arm mounting is not distorted or else it must be replaced.

TRACK CONTROL ARM

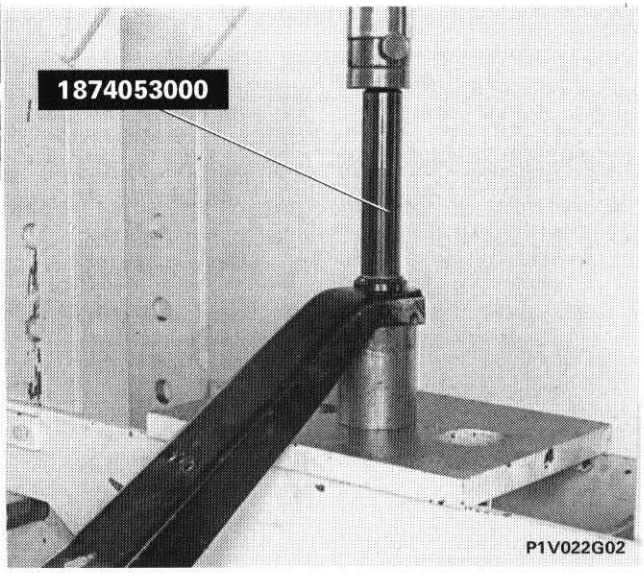


Check that the track control arm is not distorted or else it must be replaced.
Check that the flexible bushes are not worn or else they have to be replaced.

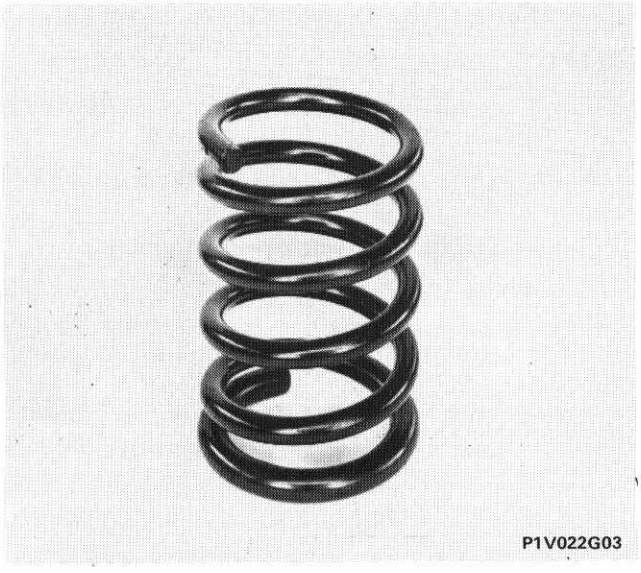
44.



Removing-refitting fleixble bush from lower section of track control arm



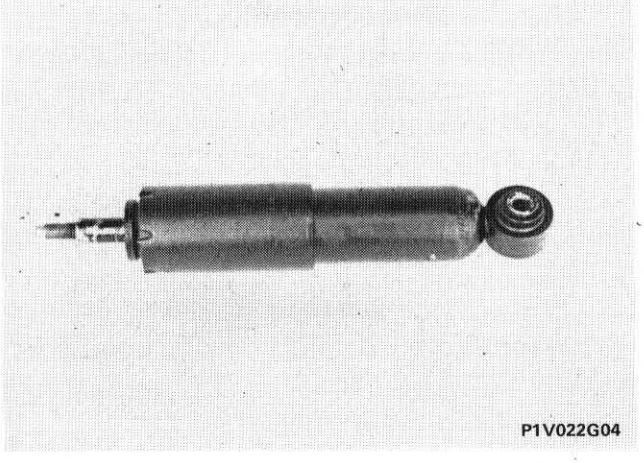
Removing-refitting flexible bush from front section of track control arm



Coil spring

Make sure that there are no cracks or distortions which would adversely affect its operation.

NOTE *The coil springs are subdivided and marked with a stripe of either yellow or green paint. Springs of the same category must be fitted.*

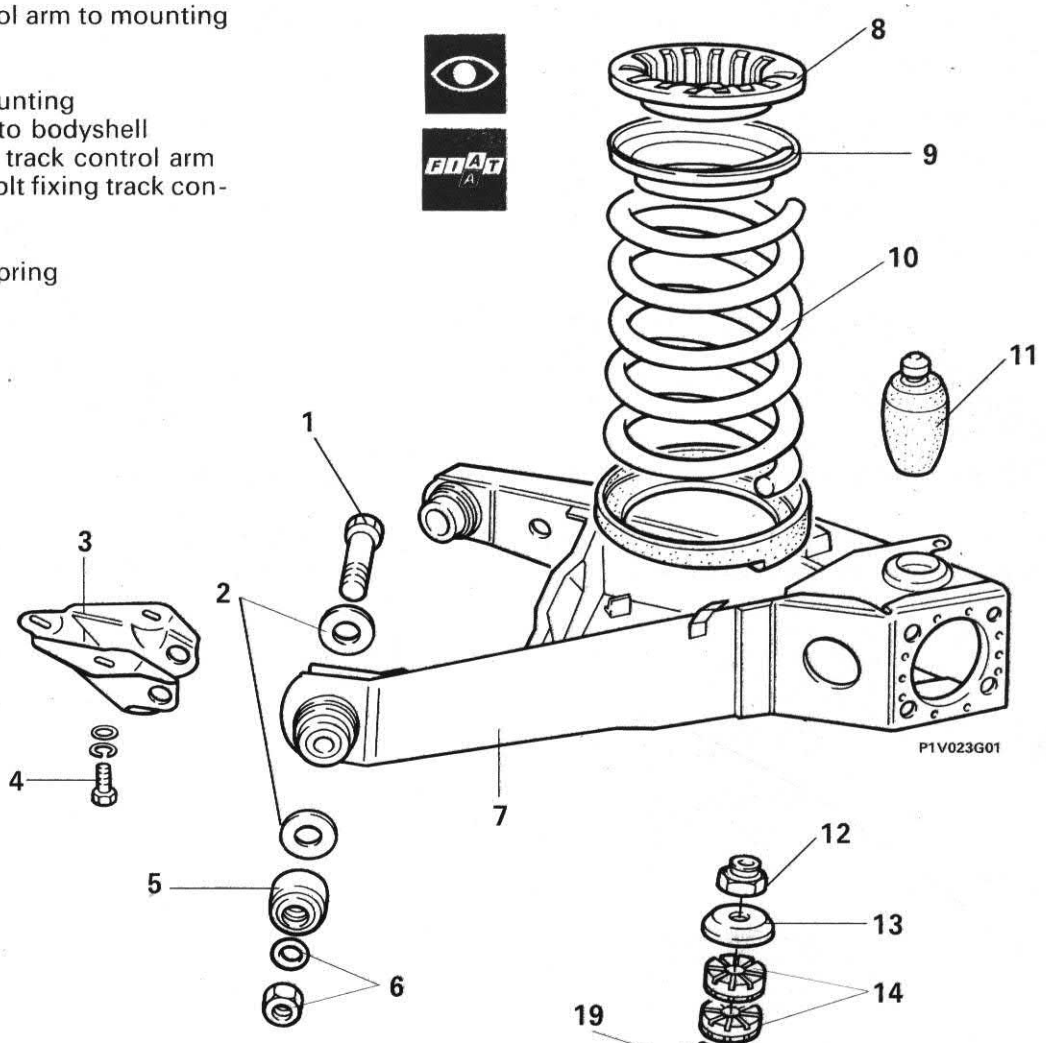


Shock absorber

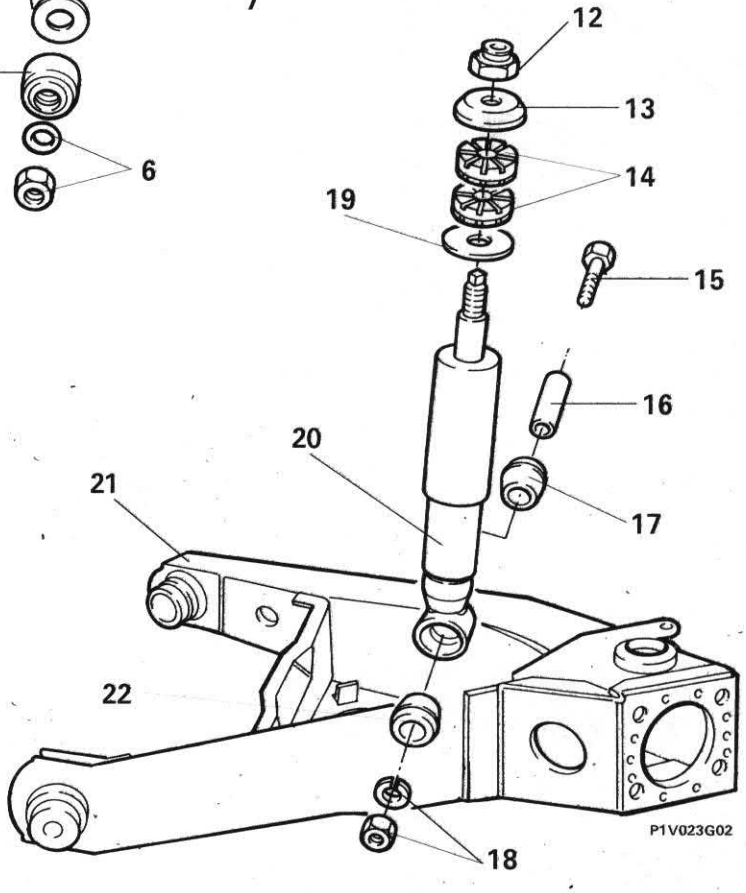
If any faults are found in the shock absorber, it must be replaced in one piece.

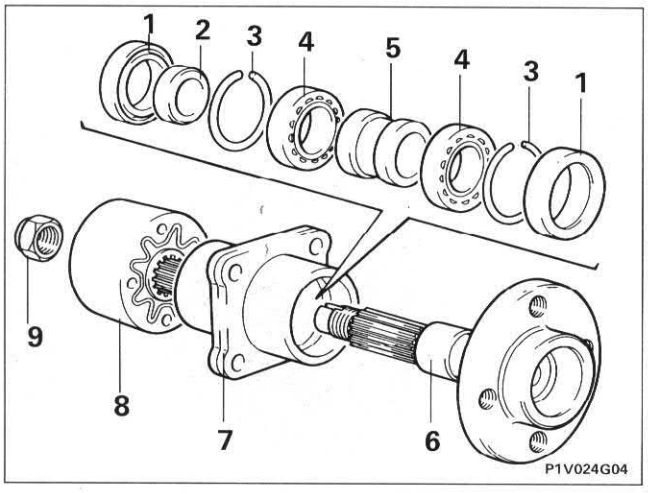
REAR SUSPENSION COMPONENTS AVAILABLE AS SPARES

1. Bolt fixing track control arm to mounting
2. Adjustment shims
3. Track control arm mounting
4. Bolt fixing mounting to bodyshell
5. Flexible mounting for track control arm
6. Nut with washer for bolt fixing track control arm to mounting
7. Track control arm
8. Rubber seal for coil spring
9. Rubber seal housing
10. Coil spring
11. Rubber buffer



12. Nut for fixing hydraulic shock abosrber to bodyshell
13. Cap
14. Upper flexible bushes
15. Bolt fixing hydraulic shock absorber to track control arm
16. Bush fixing hydraulic shock absorber to track control arm
17. Lower flexible bush
18. Nut with washer for bolt fixing hydraulic shock absorber to track control arm
19. Washer
20. Hydraulic shock absorber
21. Track control arm
22. Lower flexible bush



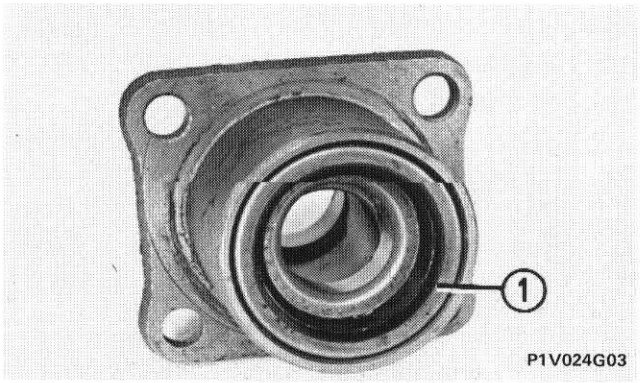


WHEEL HUB

Wheel hub components

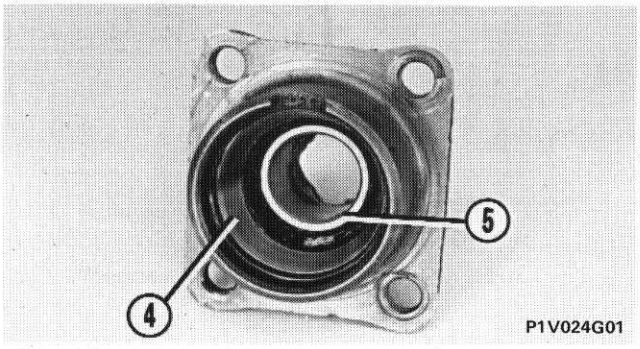
1. Seal on hub
2. Spacer
3. Circlips
4. Roller bearings
5. Flexible spacer
6. Wheel shaft
7. Wheel hub
8. Flexible joint
9. Nut fixing flexible joint and hub to wheel shaft

The presence of the flexible spacer between the two bearings ensures constant adjustment and reduces the axial variations during operation.



Removing - refitting seal on hub

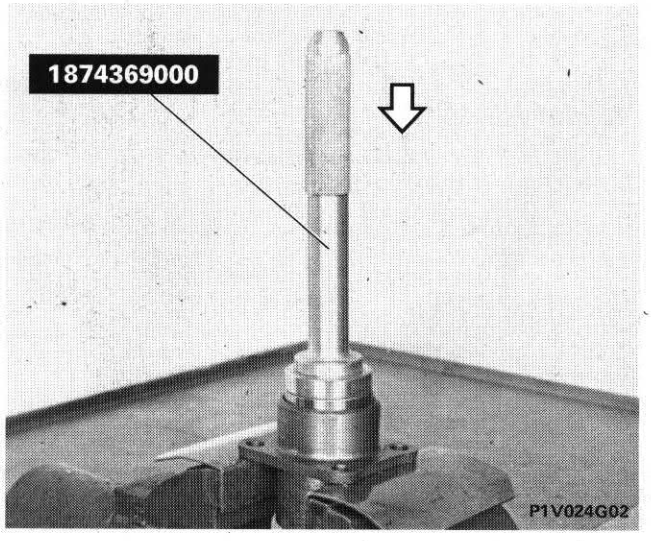
The operations of removing - refitting are carried out using ordinary methods.



Removing roller bearing outer race

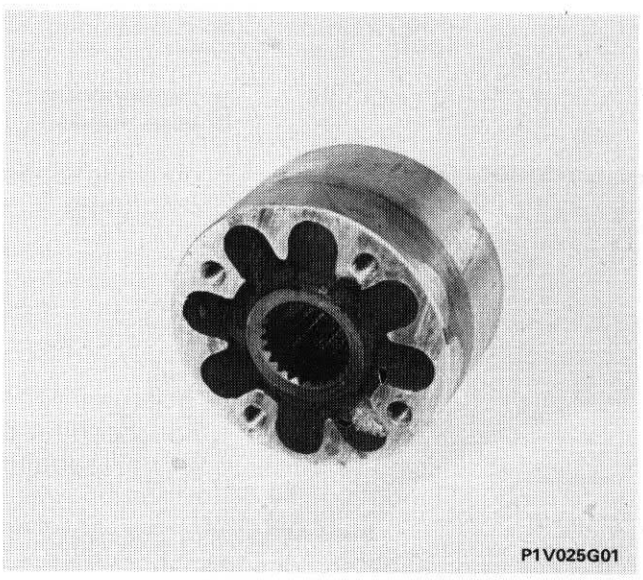
The removal is carried out using an ordinary drift.

The flexible spacer (5) and the nut (9) fixing the spacer and the hub to the wheel shaft (6) should always be replaced each time they are removed.



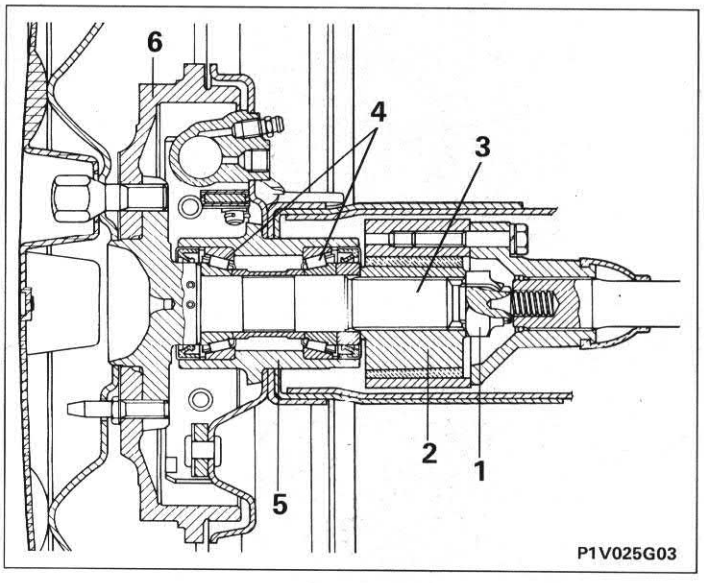
Fitting internal and external roller vearing outer races on rear wheel hub

When refitting the bearings, they should be generously greased using TUTELA MR3 grease.



Flexible joint

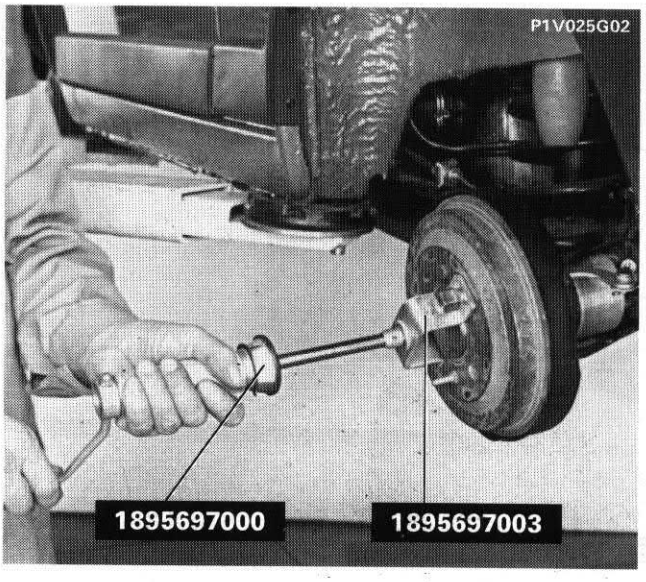
The flexible joint should not have undergone any damage which would adversely affect the join between the metal and rubber sections.



Longitudinal section of left rear wheel hub and brake drum

1. Nut fixing flexible joint and hub to wheel shaft
2. Flexible joint
3. Wheel shaft
4. Wheel hub bearings
5. Wheel hub
6. Brake drum

REAR WHEEL HUB BEARING PRE-LOADING

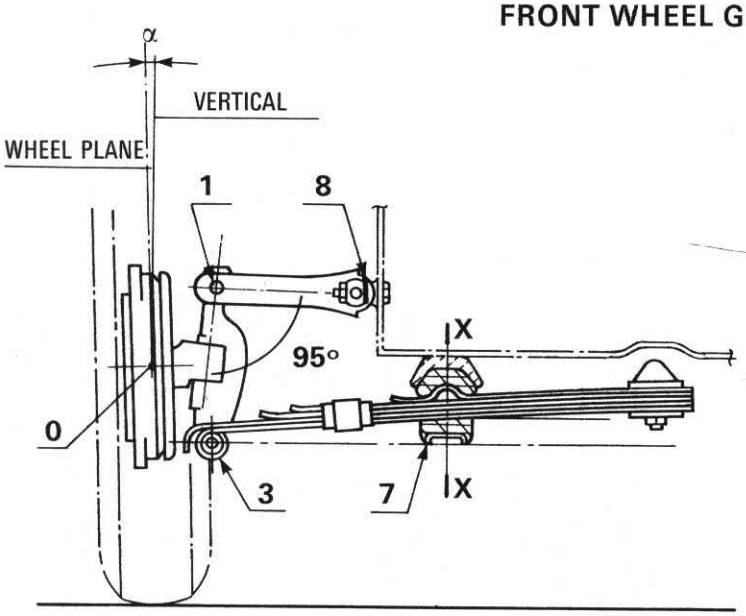


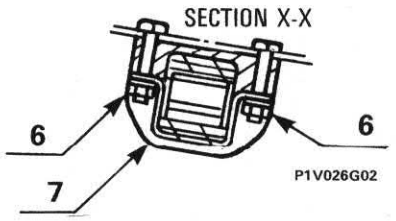
Checking rear wheel hub bearing rolling torque

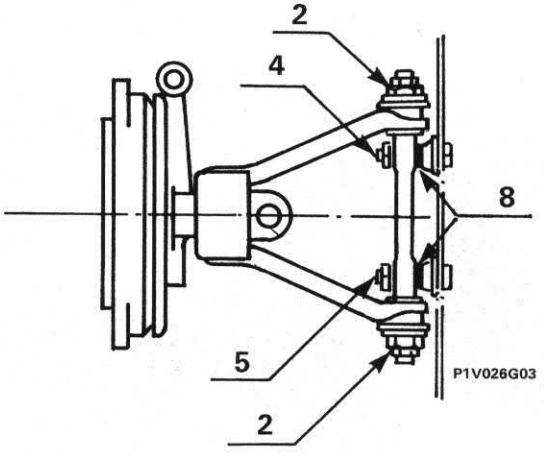
In order to avoid excess clearance or hardening during rotation, the nut fixing the flexible joint to the hub on the wheel shaft must be tightened gradually so that the rolling torque does not exceed 5 kgcm. When the adjustment has been completed the nut (1) should be staked at the wheel shaft (3) end.

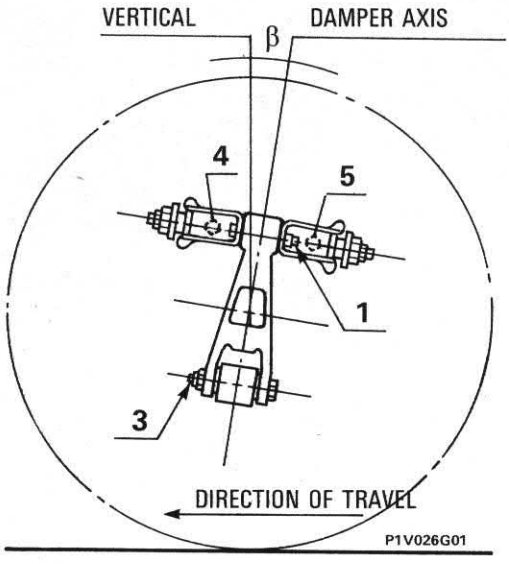
44.

FRONT WHEEL GEOMETRY

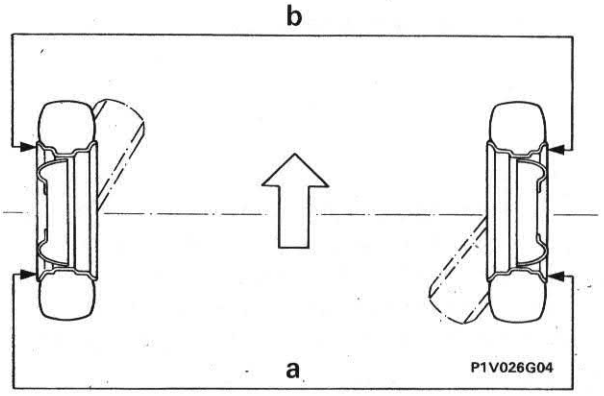








TOE IN	a - b = 2 ÷ 6 mm
CAMBER	α = 1°40′ ± 30′
CASTER	ε = 9° ± 1°



Diagrams for checking and adjusting camber, toe in and caster angles for steering knuckles

1. Pin and nut for join between track control arm and steering knuckle
2. Nuts fixing pin to track control arms
3. Pin and nut for join between leaf spring and steering knuckle
4-5. Bolts with nut for fixing track control arm to bodyshell
6. Nuts fixing leaf spring mounting to body-shell
7. Leaf spring flexible mounting
8. Shims for adjusting camber and caster angles
0. Wheel centre

The wheel geometry should be checked after subjecting the components which affect it to the following checks:

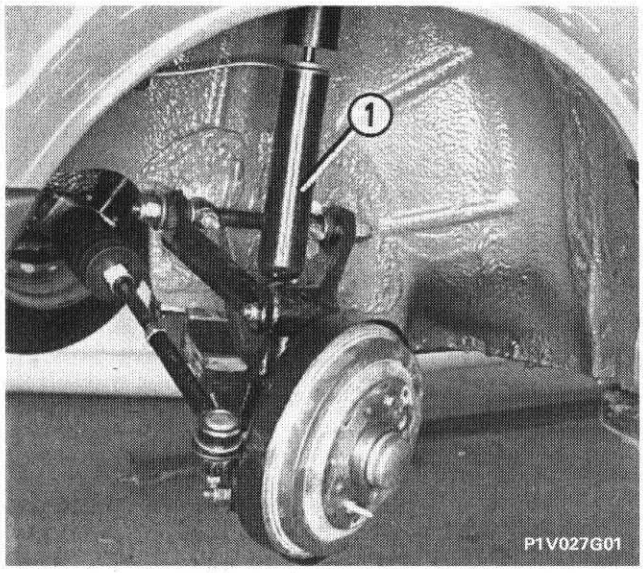
- check tyre inflation pressure;
- check eccentricity and squareness of wheel rims which should not exceed 3 mm;
- check wheel bearing end float (0.025 - 0.100 mm);
- check clearance between steering knuckle damper and pin;
- check steering track rod end clearance.

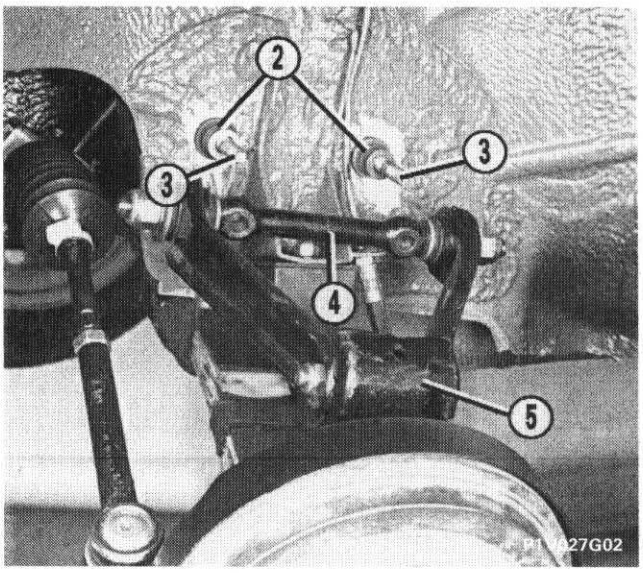
If the results of the wheel geometry check differ from the figures given, proceed as follows:

- for the toe in, act on the steering box rods after loosening the fixing nuts (see section 41, pager 12);

- for the adjustment of the camber and caster angles, follow the instructions given below.

ADJUSTING FRONT WHEEL CAMBER ANGLE



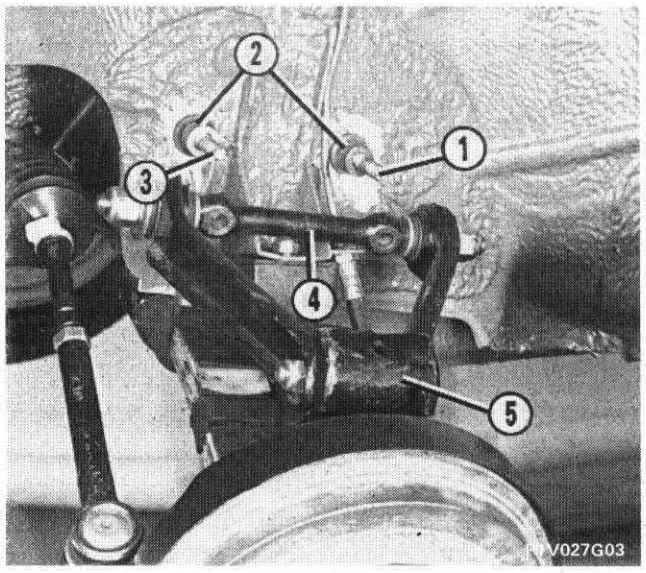


In order to adjust the camber angle, disconnect the shock absorber (1) from the bodyshell, remove the track control arm (5) and alter the number of adjustment shims (2) placed between the track control arm (5) pin (4) and the bodyshell; remove an equal number of shims from both bolts (3) to decrease the camber angle or alternatively add an equal number of shims to both bolts (3) to increase it.

ADJUSTING DAMPER CASTER ANGLE

In order to adjust the damper caster angle, disconnect the shock absorber from the bodyshell, remove the track control arm (5) and alter the number of adjustment shims (2) placed between the track control arm and the bodyshell;

- in order to increase the caster angle, move shims (2) from the rear bolt (1) to the front bolt (3);
- in order to decrease the caster angle, on the other hand, move shims from the front bolt (3) to the rear bolt (1).

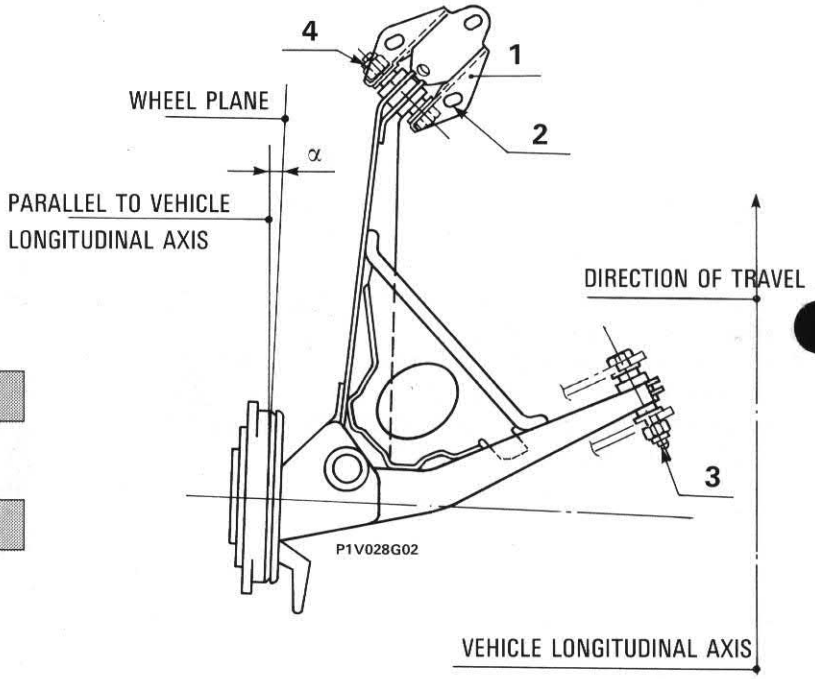


44.

REAR WHEEL GEOMETRY

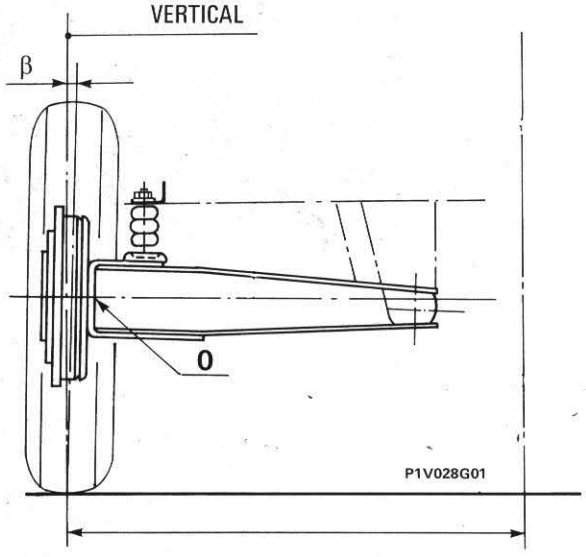
The wheel geometry should be checked after the following checks have been carried out:
- tyre inflation pressure;
- the eccentricity and squareness of the wheel rims should not exceed 3 mm;
- check wheel bearing end float.

Diagrams for checking and adjusting rear wheel toe in and camber angles



TOE IN a - b = 1,5 ÷ 5,5 mm

CAMBER (not adjustable) α = 3° ± 30′



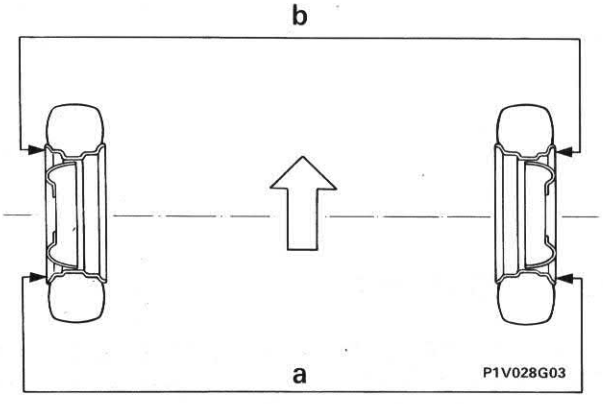
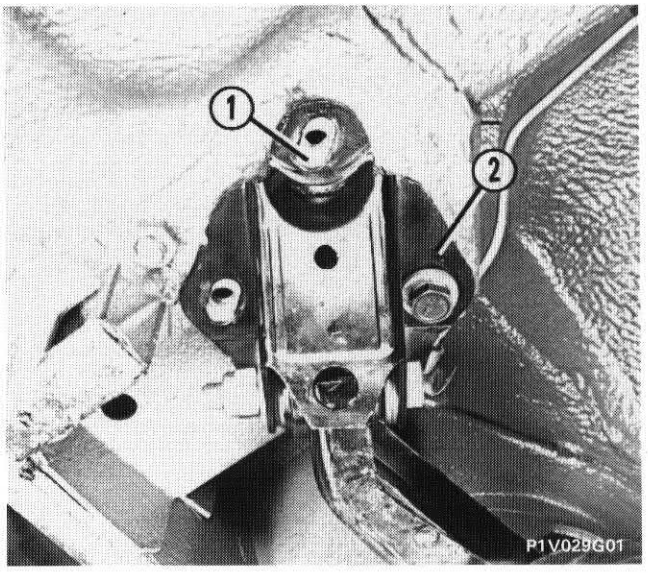


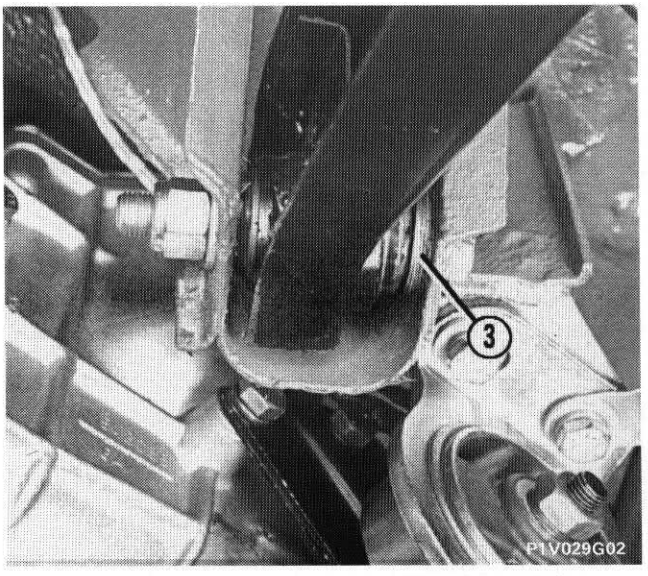
Diagram for checking toe in

1. Mounting for fixing track control arm to bodyshell
2. Slots in mounting for adjusting rear wheel toe in
3. Pin and nut fixing track control arm to bodyshell
4. Pin and nut fixing track control arm to mounting
0. Wheel shaft centre

ADJUSTING TOE IN



The adjustment of the rear wheel toe in is carried out by moving the bearing (2) on the fixing bolts.
This movement is made possible by the slots (1) in the actual bearing.
If the toe in needs considerable adjustment, also move the adjustment shims (3) for the track control arm rear mounting from one end of the flexible bush to the other.



WHEEL ALIGNMENT

Checking the alignment of the rear wheels with the front wheels should be carried out to check that front wheel torque and the rear wheel torque are symmetrical in relation to the vehicle centre line axis. The degree of error found should be divided equally between the two rear wheels in order to alter the track.
The adjustment of the rear wheel alignment with the front wheels is carried out by moving an equal number of adjustment shims from one side of the track control arm to bodyshell mounting flexible bushes to the other.
The same operation should be carried out in reverse for the track control arm mountins on the other side.

44.

1847014000 Percussion extractor for wheel hub covers

1847015000 Tool for removing front wheel hubs

1847017004 Plate for removing wheel hubts (to be used with tool 1847017001)

1857020000 Spanner for retaining rear shock absorber stem whilst tightening and loosening fixing nut

1857030000 Spanner for retaining front shock absorber stem whilst loosening and tightening fixing nut

1874016000 Drift for removing - refitting bushes on steering knuckle

1874053000 Drift for removing - refitting flexible bushes on rear suspension arm

1874056000 Drift for removing - refitting flexible bushes on steering knuckle and leaf spring

1874057000 Guide pin for fitting shims on rear suspension track control arm

1874088000 Drift for fitting wheel hub covers

1874140002 Pair of tools for staking front wheel hub nuts (to be used with tool 1874140001)

1874366000 Drift for fitting front wheel hub outer bearing outer race (to be used with tool 1870007000)

1874367000 Tool for removing flexible bushes from front suspension track control arm (on the press)

1874369000 Drift for fitting rear wheel hub bearing outer race (to be used with tool 1870007000)

1890316001 Reamer for roughening steering knuckle bushes

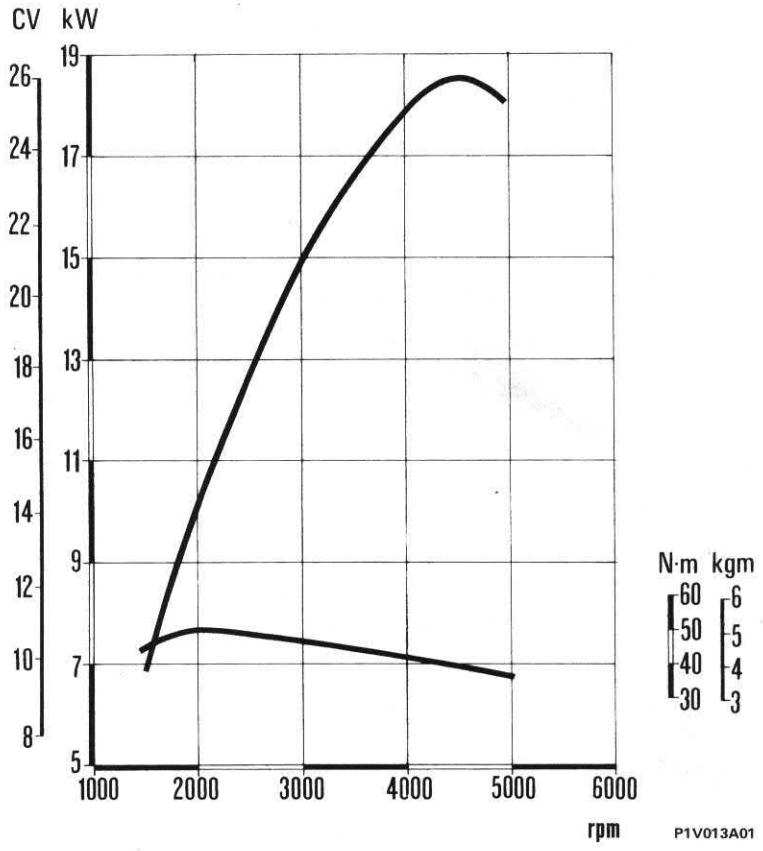
1890316002 Reamer for finishing steering knuckle bushes

1895697003 Tool for measuring rear wheel hub bearing rolling torque (to be used with tool 1895697000)

DESCRIPTION	Thread size	Tightening torque
		daNm
FRONT SUSPENSION		
Front wheel fixing bolt/nut	M 12 x 1,25	6,9
Leaf spring to steering knuckle fixing, nut with polyammide ring	M 10 x 1,25	3,9
Track control arm to pin fixing, nut	M 14 x 1,5	4,9
Track control arm to pin fixing, nut with polyammide ring	M 14 x 1,5	5,9
Front suspension rubber buffer fixing, nut	M 8	1,5
Leaf spring flexible mounting, nut with polyammide ring	M 10 x 1,25	4,9
Track control arm pin to bodywork fixing, nut with polyammide ring	M 10 x 1,25	4,9
Pin fixing track control arm to steering knuckle fixing, nut with polyammide ring	M 10 x 1,25	5,7
Front suspension upper and lower shock absorber fixing, nut	M 8	2
Left steering knuckle, nut to be staked	M 14 x 1,5	(see page 12)
REAR SUSPENSION		
Rear wheel fixing nut/bolt	M 12 x 1,5	6,9
Rear suspension rubber buffer fixing, nut	M 8	1,5
Rear suspension front arm mounting to under body fixing, bolt	M 10 x 1,25	4,7
Rear suspension attachment pin, nut with polyammide ring (low type)	M 12 x 1,25	7,8
Rear suspension upper and lower shock absorber fixing, nut with polyammide ring	M 12 x 1,25	2,9
Rear wheel brake back plate and hub to track control arm fixing, nut	M 10 x 1,25	5,6

SPECIFICATIONS

		703
Type		126 A2.000
Cycle		OTTO 4 stroke
Number of cylinders		2 in line
Bore	mm	80
Stroke	mm	70
Capacity	cc	703
Compression ratio		8.6 ± 0.15
Power output (EEC)	kW (hp)	18.5 (26)
	rpm	4500
Torque rating (EEC)	daNm (kgm)	4.7 (5)
	rpm	2000



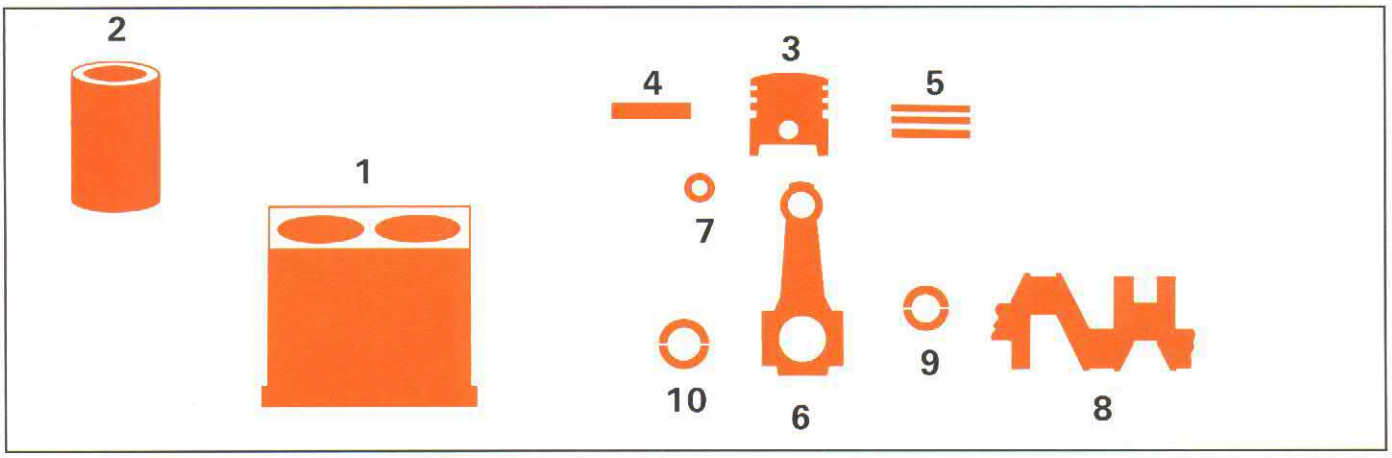
Power output curves measured by the EEC method

The power curve illustrated can be obtained when the engine is overhauled and run in, without fan, with exhaust silencer and air cleaner fitted and at sea level.

Bench tests on overhauled engines

When bench testing overhauled engines, they should not be run at maximum speed but in accordance with the data specified in the table below; running in should be completed in the car.

Test speed (rpm)	Time in minutes	Brake load
800 - 1000	10'	no load
1500	10'	no load
2000	10'	no load

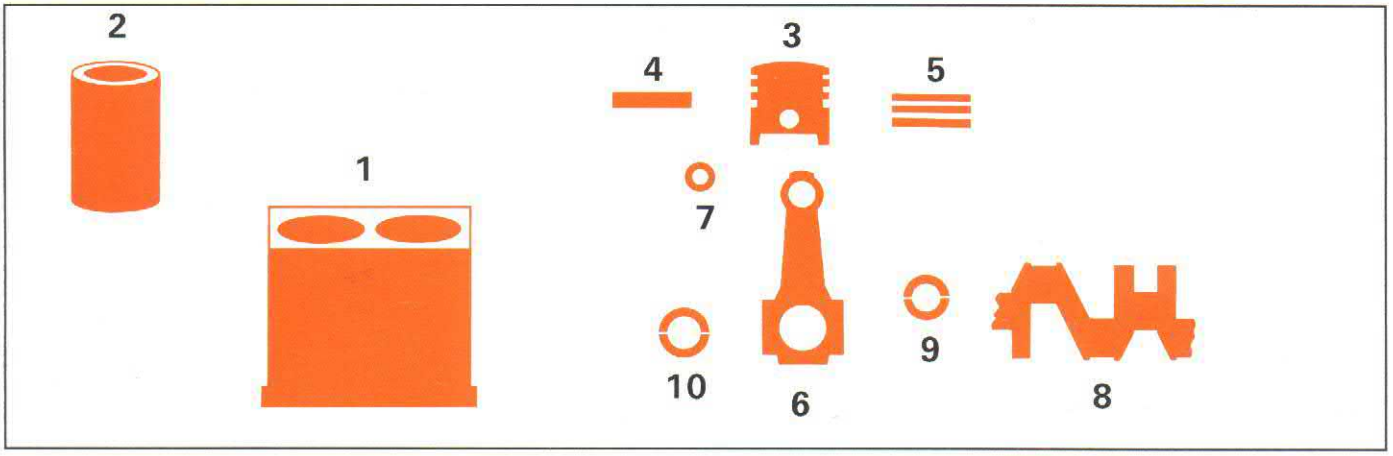


DIMENSIONS AND TOLERANCES		mm
Camshaft journal or bush locations		
timing gear side	$\varnothing_1$	22.015 - 22.036
flywheel side	$\varnothing_2$	43.020 - 43.045
Tappet locations	$\varnothing$	22.021 - 22.030
1 Cylinder liner location	$\varnothing$	85.970 - 86.000
Cylinder liner		
2	$\varnothing_1$ A	80.000 - 80.010
	$\varnothing_1$ B	80.010 - 80.020
	$\varnothing_1$ C	80.020 - 80.030
	$\varnothing_2$	85.920 - 85.940
	$\varnothing_1$ FIAT >	- (*)
2-1 Cylinder liner - Block		0.030 - 0.060

(*) Replacement block is supplied complete with cylinder liners

DIMENSIONS AND TOLERANCES			mm
3 Piston		X	14.5
	∅	A	79.950 - 79.960
	∅	B	79.960 - 79.970
	∅	C	79.970 - 79.980
	∅ FIAT >		0.4
3	Piston weight imbalance		± 5 g
3-1	Piston - Cylinder bore		0.040 - 0.060
3	Gudgeon pin location	∅	19.996 - 20.000
4	Gudgeon pin	∅	19.990 - 19.994
	∅ FIAT >		–
4-3	Gudgeon pin - Pin location		0.002 - 0.010
3	Piston ring grooves	1	1.535 - 1.555
		2	2.030 - 2.050
		3	3.967 - 3.987
5 Piston rings	L	1	1.478 - 1.490
	L	2	1.978 - 1.990
	L	3	3.925 - 3.937
	∅ FIAT >		0.4
5-3	Piston rings Piston ring grooves	1	0.045 - 0.077
		2	0.040 - 0.072
		3	0.030 - 0.062
5-2	Piston ring end gap	1	0.30 - 0.45
		2	0.20 - 0.35
		3	0.20 - 0.35

00.10



DIMENSIONS AND TOLERANCES			mm
6	Small end bush or gudgeon pin location	$\varnothing_1$	21.939 - 21.972
	Big end bearing location	$\varnothing_2$	47.130 - 47.142
7	Small end bush	$\varnothing_1$	22.000 - 22.006
		$\varnothing_2$	20.000 - 20.006
		$\varnothing_1$ FIAT >	0.2 - 0.5
7-6	Small end bush Bush location		0.028 - 0.091
4-7	Gudgeon pin Small end bush		0.006 - 0.016
8	Main journals	$\varnothing_1$ 1	53.970 - 53.980
		$\varnothing_1$ 2	53.980 - 53.990
	Crankpins	$\varnothing_2$	44.000 - 44.020
9	Big end bearings	(*) $\varnothing$ 1	54.010 - 54.025
		(*) $\varnothing$ 2	54.020 - 54.035
		$\varnothing_1$ FIAT <	0.2 - 0.4 - 0.6 - 0.8 - 1.00
9-8	Big end bearings - Journals		0.030 - 0.055

(*) Fully machined and complete with caps

DIMENSIONS AND TOLERANCES

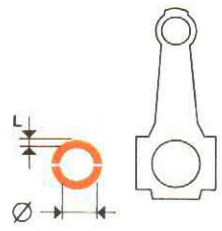
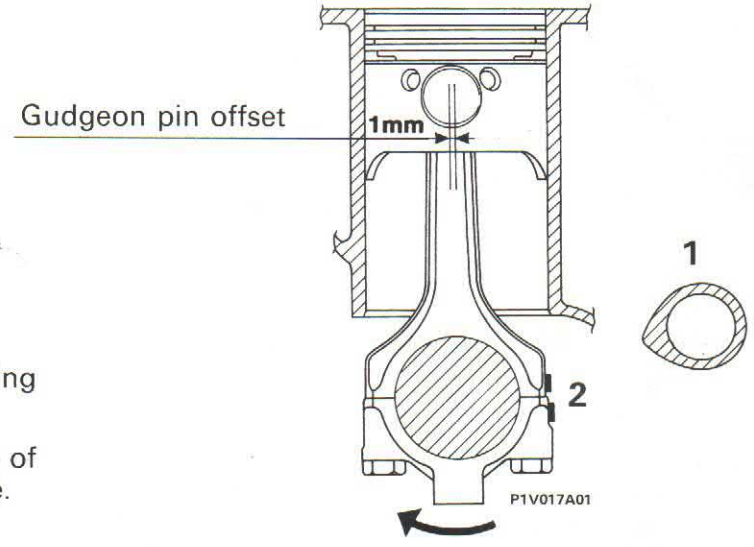
		mm
10 	Big end bearings L	1.534 - 1.543
	∅ FIAT <	0.254 – 0.508
10-8	Big end bearings-Crankpins	0.024 - 0.074

Diagram of piston/connecting rod assembly showing orientation in engine



1. Camshaft
2. Area where the number of the connecting rod's matching cylinder bore is stamped

The arrow indicates the direction of rotation of the engine viewed from the timing gear side.

Clockwise rotation

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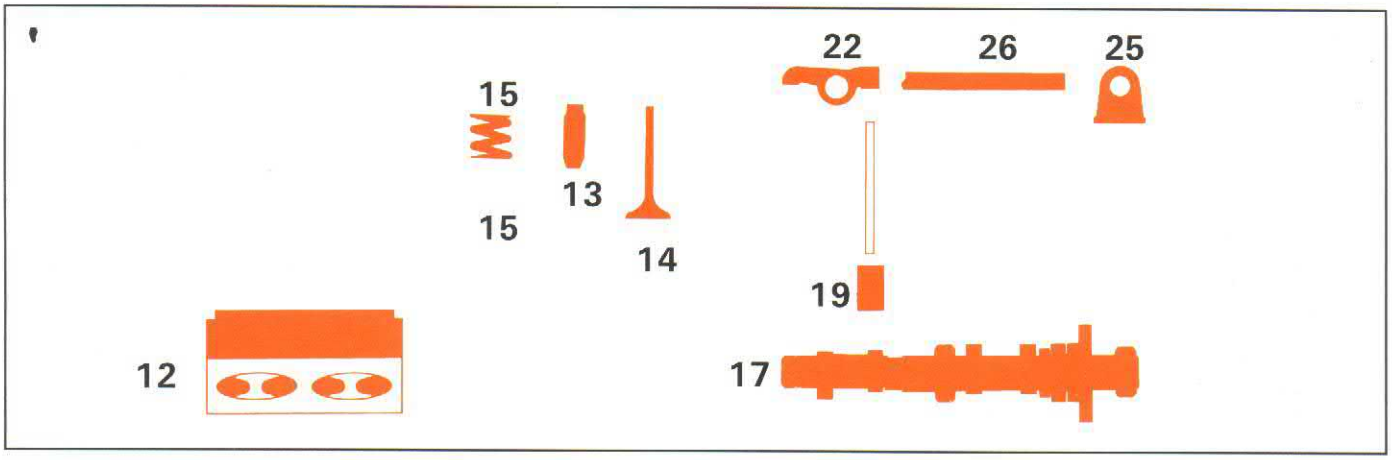
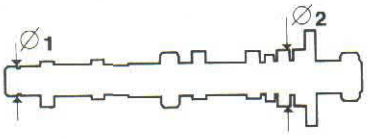
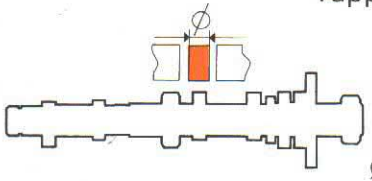
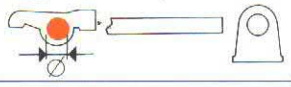
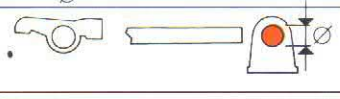


DIMENSIONS AND TOLERANCES		mm
12	Valve guide bore in cylinder head ∅	13.950 - 13.977
	Valve seat α	45° ± 5′
	L	approx. 2
13	Valve guide ∅1	8.022 - 8.040
	∅2	14.040 - 14.058
	∅2 FIAT >	0.05 - 0.10 - 0.25
13-12	Valve guide Bore in cylinder head	0.063 - 0.108
14	Valves ∅1	7.974 - 7.992
	∅2	32
	α	45° 30′ ± 5′
	∅1	7.974 - 7.992
	∅2	27
	α	45° 30′ ± 5′
14-13	Valve – Valve guide	0.030 - 0.066

DIMENSIONS AND TOLERANCES

			mm
15	 Valve spring	P_1	27.7 - 31.2 daN
		H_1	39
		P_2	61.0 - 66.7 daN
		H_2	29.3
17	 Camshaft journals	$\varnothing_1$	21.979 - 22.000
		$\varnothing_2$	42.975 - 43.000
	 Cam lift	→	5.868
		↻	5.868
17-1	(between camshaft journals and locations in block)	timing gear side	0.015 - 0.057
		flywheel side	0.020 - 0.070
19	 Tappets	$\varnothing$	21.978 - 21.996
		$\varnothing$ FIAT >	0.05 - 0.10
19-1	Tappet Location in block		0.025 - 0.052
22	 Rocker arms	$\varnothing$	18.016 - 18.043
25	 Pedestals	$\varnothing$	18.005 - 18.023
26	 Rocker shaft	$\varnothing$	17.988 - 18.000
26-22	Rocker shaft - Rocker arms		0.016 - 0.055
26-25	Rocker shaft - Pedestals		0.005 - 0.035

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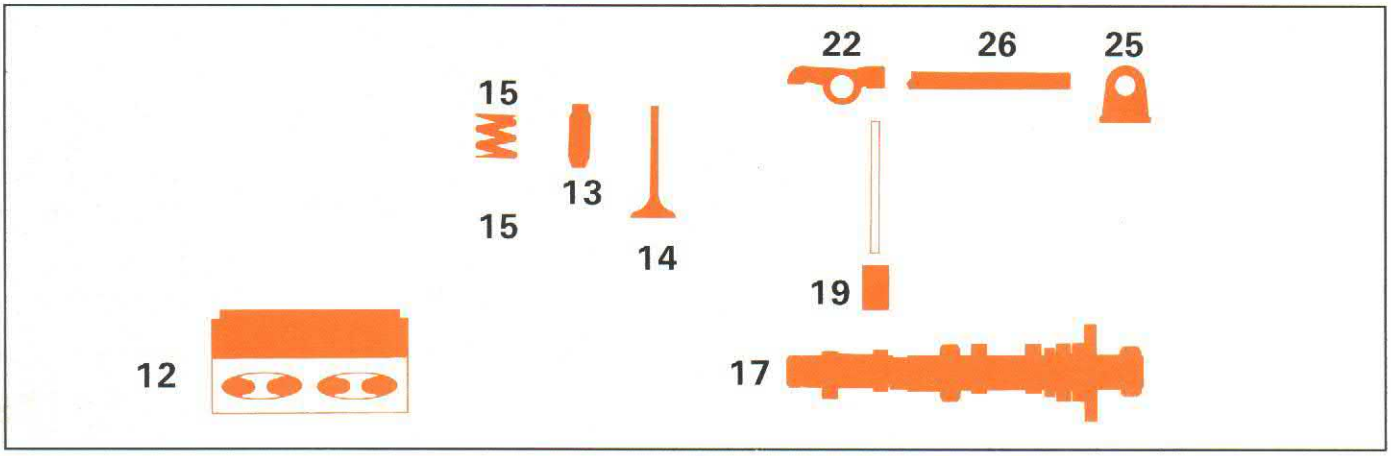
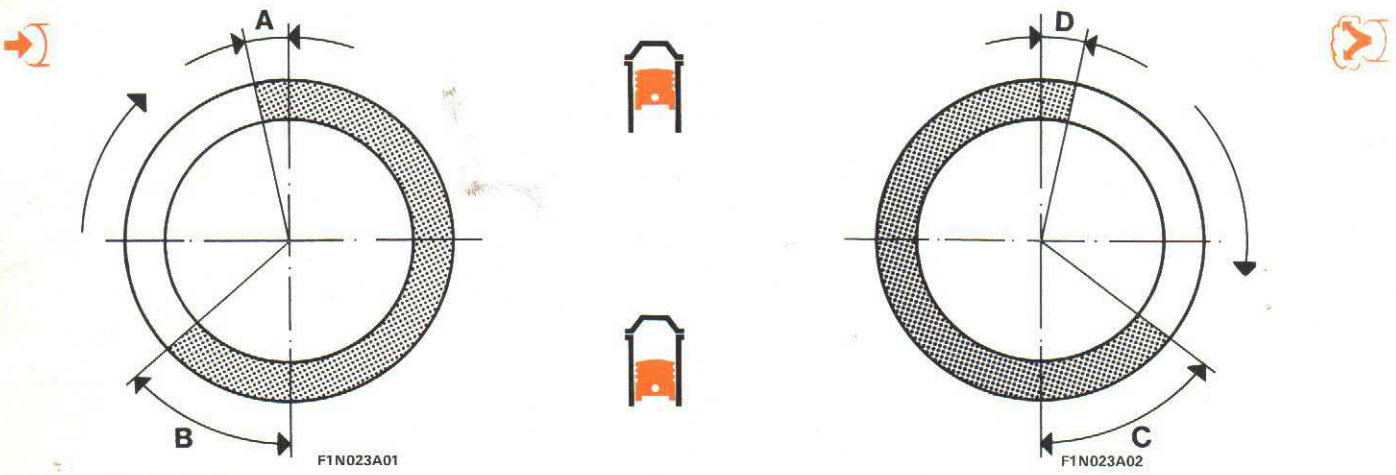


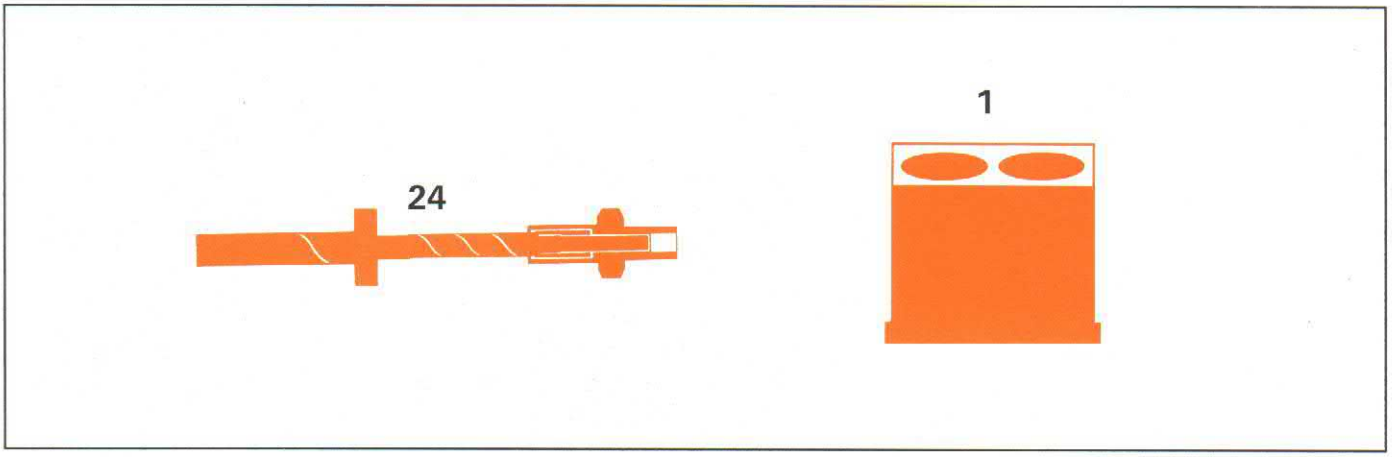
DIMENSIONS AND TOLERANCES		mm
for checking timing		0.39
		0.39
operating		0.15 ± 0.05
		0.15 ± 0.05
Volume of combustion chamber in cylinder head	cc	(average value) 39.15

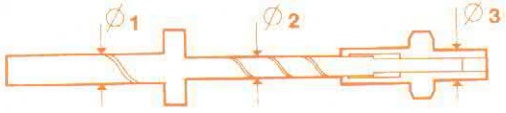
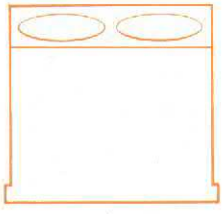
TIMING DIAGRAM



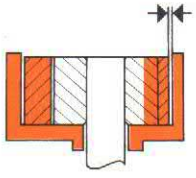
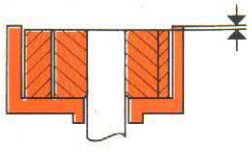
VALVE TIMING

A	Inlet	opens before TDC	25°
B		closes after BDC	51°
C	Exhaust	opens before BDC	64°
D		closes after TDC	12°

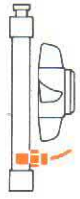


DIMENSIONS AND TOLERANCES			mm
24  Ancillary components shaft journals		Ø1	15.989 - 16.000
		Ø2	11.901 - 11.913
		Ø3	15.970 - 15.985
1  Ancillary components shaft bearings	on oil sump	Ø1	16.016 - 16.034
	on oil inlet suction rose	Ø2	11.939 - 11.956
	on block	Ø3	16.016 - 16.037
24-1 	Ancillary components shaft journals - Location in sump		0.016 - 0.045
	Ancillary components shaft journals - Location in oil inlet suction rose		0.026 - 0.055
	Ancillary components shaft bearings - Location in block		0.031 - 0.067

00.10

DIMENSIONS AND TOLERANCES		mm
Engine lubrication system		forced circulation by a rotor pump, with full-flow centrifugal oil filter
Oil pump type		rotor
Pump drive		ancillary components shaft
Oil pressure relief valve		incorporated in oil pump
Full-flow filter		centrifugal
Oil pressure gauge sender unit		electric
 between gear periphery and pump body		0.125 - 0.189
 between gear topand cover		0.045 - 0.120
 between driving gear and driven gear		0.025 - 0.100
 Operating pressure at 100°C		2.94 - 4.8 bar
 Oil relief valve spring	P_1	2.35 - 2.45 daN
	H_1	36
	P_2	4.29 - 4.54 daN
	H_2	29

COOLING SYSTEM

Cooling system		coolant circulation by a centrifugal pump, with radiator, two-speed fan controlled by thermal switch and expansion tank "Controlled by-pass" thermostat located on the oil sump near the centrifugal pump. Secondary circuit for coolant recirculation, comprising radiator/car interior heater	
Water pump drive		ancillary components shaft	
 Fan thermal switch		1st speed	2nd speed
		96° - 100°C	101° - 105°C
		94° - 90°C	95° - 90°C
Water thermostat	starts opening	85° - 89°C	
	fully open	100°C	
	valve stroke	⩾ 7.5 mm	
Clearance between pump impeller. and pump housing in sump 		0.191 - 0.755 mm	
Leak test pressure		0.98 bar	
Expansion tank cap relief valve test pressure		0.98 bar	

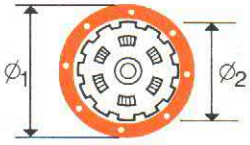
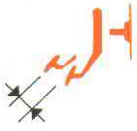
FUEL SYSTEM

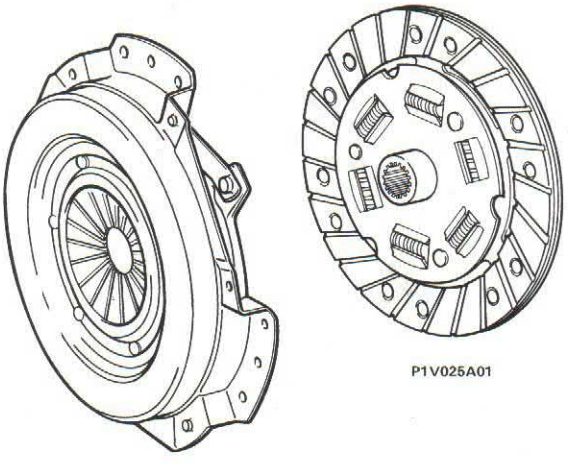
Pump	mechanical diaphragm
Capacity	45 litres/h
 at 4000 rpm  Minimum pressure crankshaft	> 0.2 bar

CHECKING IDLE SPEED AND CARBON MONOXIDE EMISSION

Engine rotation speed	850 ± 50 rpm
CO emission on idle	1 ± 0.5%

				703	
				WEBER 30 DGF 3/150	
CARBURETTOR				Stage 1	Stage 2
Venturis			mm	18	19
Auxiliary venturi			mm	2.5	2.5
Main jet			mm	0.90	0.90
Air bleed jet			mm	1.85	1.95
Emulsion tube				F 60	F 74
Slow running jet			mm	0.47	0.45
Air idle jet			mm	1.40	0.90
Pump jet			mm	0.40	–
Pump discharge orifice			mm	0.40	–
Power fuel jet			mm	–	–
Power air jet			mm	–	0.45
Power mixture jet			mm	–	1.50
Fuel inlet needle valve			mm	1.50	
Fuel recirculation jet			mm	–	–
Idle mixture adjustment jet			mm	1.30	–
Pull-down vacuum bush			mm	–	–
Idle mixture bush			mm	1.10	–
Progression holes	1st orifice		mm	1.00	1.20
	2nd orifice		mm	1.05	1.20
	3rd orifice		mm	1.10	–
	4th orifice		mm	1.00	–
Float level with gasket			mm	9.5 - 10.5	
Float stroke			mm	–	
Pump ejection (10 deliveries)			cc	8.5 - 14	
Stage 1 partial aperture			mm	4.45 - 4.95	
Stage 1/Stage 2 full aperture			mm	13.5 - 14.5	
Fast idle			mm	0.40 - 0.45	
Choke valve gap		minimum gap	mm	3.5 - 4	–
		maximum gap	mm	–	–

		mm
Type		 single dry plate with release bearing
 Engagement/disengagement mechanism		 diaphragm spring
Diaphragm spring load		185 daN
 Driven plate	$\varnothing_1$	160
	$\varnothing_2$	112
	Clutch pedal position	approx. 20 mm below level of brake pedal
	Clutch pedal free travel	approx. 15 mm
Clutch operation		mechanical



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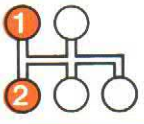
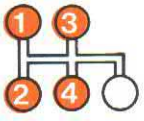
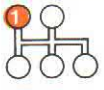
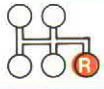
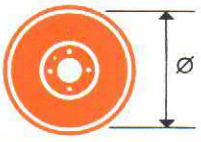
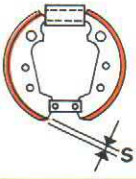
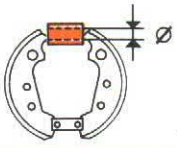
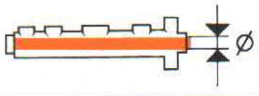
GEARBOX

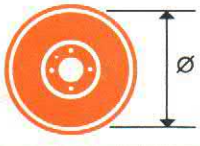
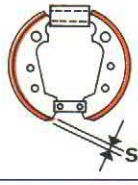
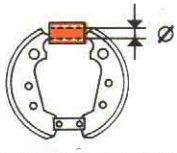
		
Synchronizers	spring segment (Porsche type) 	
	baulk ring 	
Gears	straight 	
	helical 	
Gear ratio		3.250
		2.067
		1.300
		0.872
		4.024

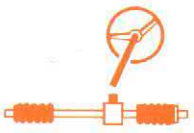
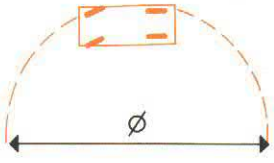
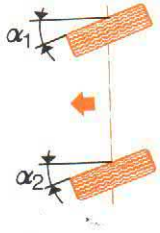
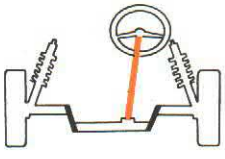
DIFFERENTIAL	mm
Crown wheel to pinion ratio	9/39 (4.333)
Ratio at the wheels	14.083
	8.957
	5.633
	3.779
	17.437
Differential carrier bearings	tapered roller bearings
Bearing preload adjustment	preload shims
Bearing preload	127 - 147 Ncm (13 - 15 kgcm)
Backlash between pinion and crown-wheel	0.08 - 0.13
Pinion position adjustment	shims
Replacement shim thickness	0.10 – 0.15
Side/pinion gear clearance adjustment	shims
Replacement shim thickness	0.7 - 0.8 - 0.9 - 1.0 - 1.1 - 1.2 - 1.3

FRONT BRAKES

	mm
 ⌀ Drum ⌀	185.24 - 185.53
⌀	186.33
⌀ > permissible	186.83
 Shoes t < permissible	1.5
 Wheel cylinders ⌀	23.80 (15/16")
 Master cylinder (pump) ⌀	19.05 (3/4")

REAR BRAKES

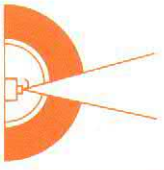
 ⌀ Drum ⌀	185.24 - 185.53
⌀	186.33
⌀ > permissible	186.83
 Shoes t < permissible	1.5
 Wheel cylinders ⌀	19.05 (3/4")

Type		 rack and pinion
 Ratio	 turns lock-to-lock	approx. 3.4 turns
	 rack travel	130 ± 1.5 mm
	Minimum turning circle	8.35 m
 Steering angle	outer wheel α_1	31°30′
	inner wheel α_2	34°30′ ± 1°30′
	Steering column	 with 2 universal joints

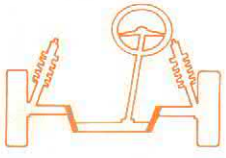
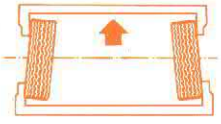
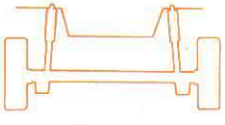
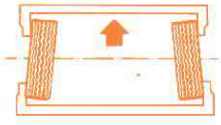
WHEELS

 Tyres		type	135/70 R 13"
	front	medium load	1.5 bar
		full load	1.7 bar
	rear	medium load	2 bar
		full load	2.5 bar
 Rim		type	pressed steel 4 x 13" H2

WHEEL GEOMETRY




vehicle unladen (*)

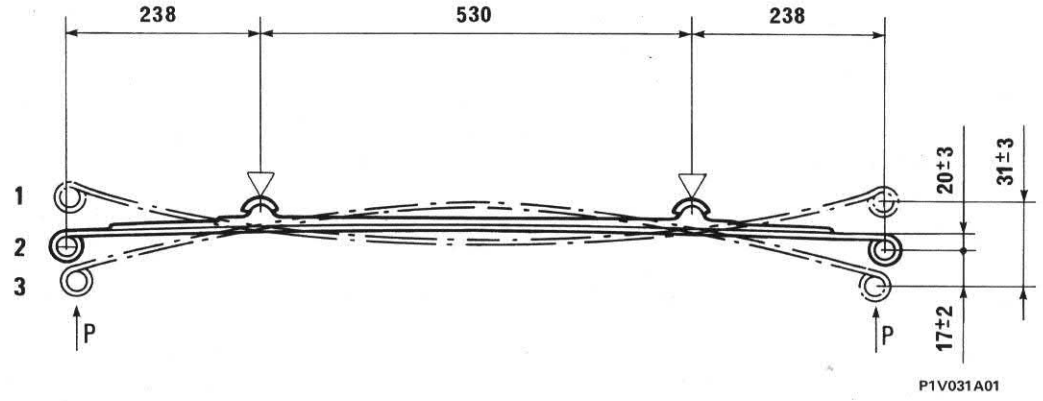
 Front suspension	camber		1°40' ± 30'
	caster		9° ± 1'
	toe-in		2 - 6 mm
 Rear suspension	camber (**)		3° ± 30'
	toe-in		1.5 - 5.5 mm

(*) Tyres inflated to the required pressure and vehicle in running order

(**) Non-adjustable angles

Front suspension independent with upper semi-trailing links and hydraulic telescopic shock absorbers. Transversal leaf spring also acting as anti-roll bar.

LEAF SPRING



Position		Load P daN	Deflection mm	Yield from position 1	Spring rate mm/100 daN
1	Start of spring rate test	120	–	–	62 - 68
2	Reference load	147	20 ± 3	17 ± 2	
3	End of spring rate test	170	–	31 ± 3	
	Settlement check	240	–	–	

SHOCK ABSORBERS

Type: double-action hydraulic	WAY-ASSAUTO	FA-KROSNO
Part number	7591334	7591348
Colour	–	black
Travel (start of damping action)	212 ± 2	216
Maximum extension	337 ± 2	333

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Rear suspension independent with semi-trailing arms, coil springs and hydraulic telescopic shock absorbers.

COIL SPRINGS

Part number		7603855
Wire diameter	mm	15 ± 0.05
Number of useful coils		4
Direction of spiral		clockwise
Uncompressed spring height	mm	approx. 208
Spring height under load of: 495 ± 17 daN	mm	148
The springs are divided into two grades marked as follows: yellow (1) if under a load of: 495 ± 17 daN — height in mm is:		> 148
green (1) if under a load of: 495 ± 17 daN — height in mm is:		⩽148

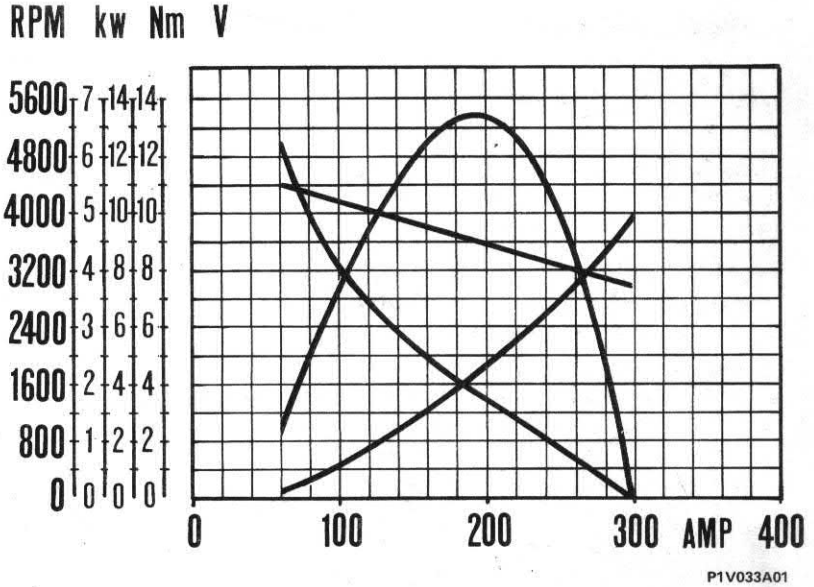
(1) The springs must be fitted in matching pairs

SHOCK ABSORBERS

Type: double-action telescopic		WAY-ASSAUTO	FA-KROSNO
Part number		7595878	7591349
Colour		grey	black
Travel (start of damping action)	mm	203 ± 2	205
Maximum extension	mm	296 ± 2	296 ± 2

STARTER MOTOR	Z.E.M. - R 76 a - 0.6 kW - 12 V
ALTERNATOR	M. Marelli - AA 125 R - 14 V - 45 A Z.E.M. - A115 - 14 V - 43 A
BATTERY	34 Ah - 12 V -140 A
VOLTAGE REGULATOR	Electronic integral { FIMM RTT 119 A 15 TR b
IGNITION SYSTEM	contact breaker, with centrifugal and vacuum advance
IGNITION DISTRIBUTOR	M. Marelli S 314 A ZELMOT 3459 A
IGNITION COIL	M. Marelli BZ 600 A BIAZET 101
SPARK PLUGS	M. Marelli F7LCR Champion RN9YC Bosch WR7DC

STARTER MOTOR - OUTPUT CURVES



Z.E.M. - R 76 a - 0.6 kW - 12 V

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STARTER MOTOR

Type		Z.E.M. - R76a - 0.6 kW - 12 V
Voltage	V	12
Rated power	kW	0.6
Rotation, pinion end		anti-clockwise
Field coils		4
Excitation		armature
Starter drive		overrun clutch
Operation		electromagnetic
Armature shaft endfloat	mm	0.15 - 0.45
Bench test data		
Operating test (*):		
current	A	150
speed	rpm	capprox. 2100
voltage	V	9.7
torque	daNm	0.26
Engagement test (*):		
current	A	approx. 300
voltage	V	7.3
torque	daNm	⩾β0.99
Free running test (*):		
current	A	40 - 50
voltage	V	11.3
speed	rpm	> 6000
Solenoid		
Winding resistance (*)	cut in Ω	0.33
	pull in Ω	1.27
Lubrication		
Pinion drive splines and shaft bushes		VS+ SAE 10 W
Pinion drive sleeve and intermediate plate		TUTELA MR3

(*) Data measured at an ambient temperature of 20°C.

NOTE *When the starter motor is overhauled, the commutator need not be skimmed and undercut*

ALTERNATOR

Type		M. Marelli	Z.E.M.
Model		AA 125 R - 14 V - 45 A	A 115 - 14 V - 43 A
Rated voltage	V	14	
Maximum current output	A	approx. 47	43
Cut in speed (hot)	rpm	1050	1200
Current delivered to battery at 7000 rpm at operating temp.	A	⩾ 45	⩾ 43
Stator resistance between the two slip rings (*)	Ω	3 - 3.2	2.7 - 3.3
Direction of rotation (viewed from drive end)		clockwise	
Engine/alternator transmission ratio		1 : 2.29	
Rectifier diodes		bridge	

VOLTAGE REGULATOR

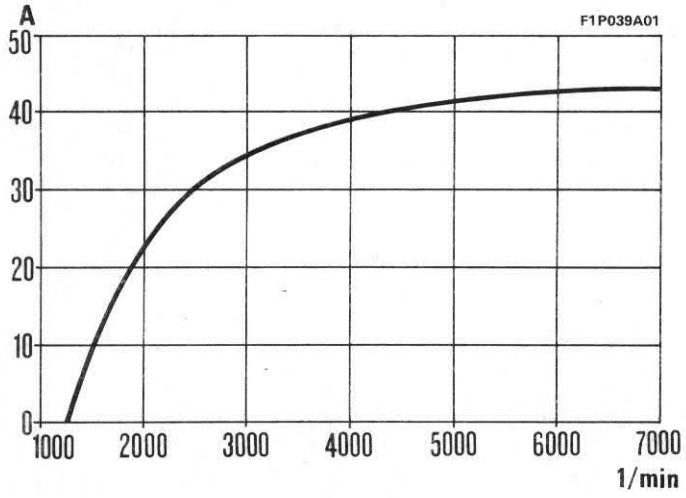
Type		Electronic integral M. Marelli RTT 119 A	Electronic integral 15 TR b
Alternator test speed	rpm	6000	
Thermal stabilization current	A	20 - 25	
Test current	A	5 - 45	
Regulation voltage (*)	V	14 - 14.3	

BATTERY

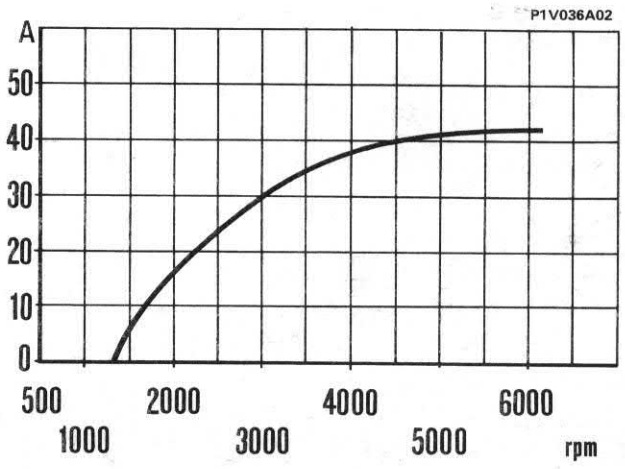
Rated voltage	V	12
Capacity (20-hour discharge rate)	Ah	34

(*) Data measured at an ambient temperature of 20°C

ALTERNATORS - CURRENT OUTPUT CURVES
(operating temperature, constant voltage of 13.5 V and brushes bedded in)

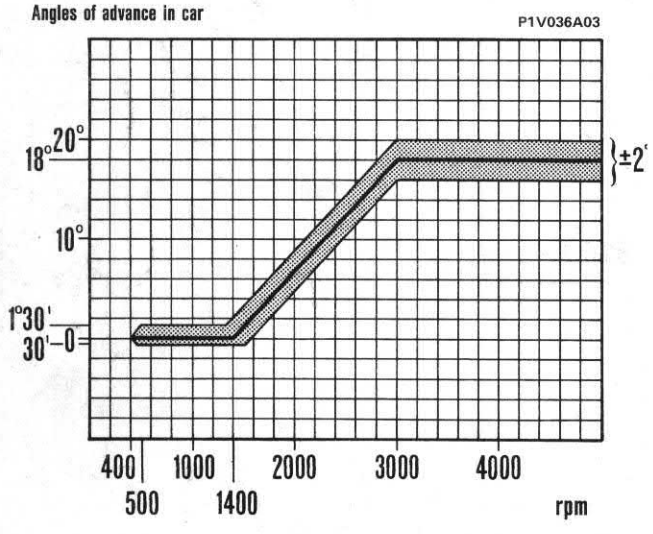


M. Marelli AA125R - 14V - 45A

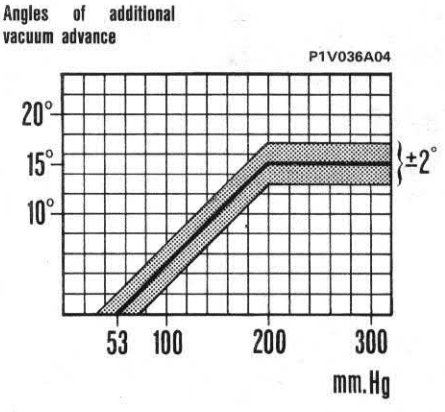


Z.E.M. A115 - 14V - 43A

DISTRIBUTORS - ADVANCE CURVES



Graph showing automatic advance of distributor in car



Graph showing vacuum advance of distributor in car

IGNITION DISTRIBUTOR

Type		M. Marelli	ZELMOT
Model		S 314 A	3459 A
Basic ignition setting on idle		10°	
Automatic centrifugal advance		18° ± 2°	
Vacuum advance		15° ± 2°	
Contact breaker points gap	mm	0.37 - 0.43	0.47 - 0.55
Cam aperture angle		102° ± 3°	
Cam closure angle		78° ± 3°	
Condenser capacity at 50-1000 Hz	μF	0.25 ± 0.025	0.25
Firing order		1 - 2	

IGNITION COIL

Type		M. Marelli	BIAZET
Model		BZ 600 A	101
Primary winding resistance (*)	Ω	1.42 - 1.54	1.44 - 1.60
Secondary winding resistance (*)	Ω	8100 - 9900	

(*) Data measured at an ambient temperature of 20°C

SPARK PLUGS

Model		M. Marelli 7 LCR Champion RC 9 YC Bosch WR 7 DC
Thread size		M 14 x 1.25
Electrode gap	mm	0.6 - 0.7